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HYDROGEOLOGIC INVESTIGATION
BLACKHAWK FACILITY
BELOIT CORPORATION

C 11440

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WARZYN ENGINEERING INC

EXECUTIVE SUMMARY AND RECOMMENDATIONS

The following summary contains conclusions and recommendations from the hydrogeologic investigation at the Blackhawk Facility, Beloit Corporation. For futher clarification of the conclusions, refer to the appropriate sections of the report.

1. The site investigation consisted of the installation and sampling of groundwater monitoring wells, measurement of water levels at on-site monitoring wells, on-site ponds and the Rock River, analysis of groundwater quality samples, analysis of soil samples, and text preparation.

2. The site is located in an area of glacial outwash deposits. Subsoils generally consist of silty sand and silty gravel and sand.

3. Groundwater within the shallow sand and gravel aquifer flows away from a groundwater high located in the northern portion of the site toward the west, south and southeast, eventually discharging into the Rock River. Seasonal fluctuations in water levels may change flow directions slightly. Water level measurements could be obtained on a seasonal basis to evaluate this possibility. Available information indicates that private water supply wells in the site vicinity withdraw from the sand and gravel aquifer.

4. Laboratory analysis of groundwater samples indicates elevated levels of specific conductivity and chloride at on-site Wells W-1, W-7, W-9 and W-10, which may be due in part to road salting of nearby roads and parking lots.

5. Volatile organic contaminants (VOCs) were detected at on-site Monitoring Wells W-1 (1,1-dichloroethylene), W-3 (1,1,1-trichloroethane and trichloroethylene) and W-5 (1,1,1-trichlorethane, trichloroethylene and 1,1,2,2-tetrachloroethylene). Analysis of samples obtained on May 17, 1984 indicated generally low levels of VOCs.

6. Private water supply wells in the site vicinity were sampled by the Illinois Environmental Protection Agency (IEPA) on four occasions. Sample analyses indicated that VOCs (1,1-dichloroethylene; 1,1-dichloroethane; 1,1,1-trichloroethane; trichlorethylene; bromoform; and 1,1,2,2-tetrachloroethylene) were present at several of the wells along Watts Avenue. Although 1,1,2,2 tetrachloroethylene was previously used by Beloit Corporation, bromoform was never used in plant operations.

7. A 24-hour leach test and EP Toxicity test on samples obtained from the storage yard area and foundry sand area indicated that these materials are not likely to contribute significant amounts of sodium, calcium, sulfate, chemical oxygen demand, chromium, nickel, manganese, zinc, iron, copper or phenols to the groundwater system.

8. The foundry sand disposal area may be a possible, but unlikely, source of VOCs in Wells W-3 and W-5, but does not appear to be a source of VOCs at private wells along Watts Avenue. The significance of impact at Wells W-3 and W-5 is discussed in Point Number 10, below.

9. The storage yard area appears to be a potential source of volatile organic contamination present at on-site Monitoring Wells W-3 and W-5 based on plant operations and the groundwater flow pattern. Beloit Corporation previously used methylene chloride and tetrachloroethylene in their operations. These chemicals may have been stored in the storage yard area.

10. Based on the levels of VOCs present in on-site Wells W-1, W-3 and W-5 and their location in the groundwater flow system with respect to private water supply wells, it does not appear that groundwater impact indicated at these wells poses a public health threat. However, it appears that impacted groundwater is leaving beneath the site boundary in the vicinity of Wells W-3 and W-5. The extent of groundwater impact beyond the site boundary has not been defined. If Beloit Corporation wishes to establish the lateral extent of this groundwater impact, additional groundwater monitoring could be performed.

11. Available water quality information does not indicate that VOCs from the storage area are impacting the private wells along Watts Avenue. However, the possibility cannot be completely discounted at the present time. If Beloit Corporation wishes to completely discount the possibility of contamination from the storage yard area impacting private wells along Watts Avenue, additional investigation could be performed. This investigation could consist of gas testing of shallow soils in the storage area for VOCs and/or installation of at least one additional

monitoring well 400 feet north of existing well W-2. Gas testing could be performed first and the monitoring wells installed only if gas testing indicated the presence of VOCs in the storage yard area.

12. It appears that the abandoned United Recovery facility is an unlikely source of VOCs present in on-site wells. However, the facility appears to be a likely source of VOCs present in private water supply wells along Watts Avenue, based on the facility's operational history and proximity to the private wells. Waste oils and chemicals were allegedly dumped onto the ground and drainage ditches behind the facility. These oils and waste chemicals may have entered the groundwater and migrated toward nearby private wells.

HYDROGEOLOGIC INVESTIGATION
BLACKHAWK FACILITY
BELOIT CORPORATION

INTRODUCTION

This report presents the results of a hydrogeologic investigation performed at the Beloit Corporation's Blackhawk Facility. The site is located in the Southern 1/2 of Section 12 and Northern 1/2 of Section 13, Township 46 North, Range 1 East, Town of Rockton, Winnebago County, Illinois.

The investigation was undertaken to assess the groundwater quality at the Blackhawk Facility due to inconclusive results from initial sampling of Monitoring Wells W-1, W-2 and W-3. Wells W-1, W-2 and W-3 were installed during October, 1983, by Warzyn Engineering Inc. (WEI) and were sampled during December, 1983 and February, 1984. Results of that sampling indicated the presence of volatile organic contaminants in all three wells on 12-21-83 and in lower concentrations at Wells W-1 and W-3, on 2-16-84 (see Appendix E).

The investigation included the following work scope:

1. Standard penetration test soil borings were performed and instrumented as groundwater monitoring wells;
2. Water level measurements were obtained from all groundwater monitoring wells, on-site ponds and the Rock River;
3. A well elevation and location survey was conducted;
4. Groundwater quality samples were obtained from on-site monitoring wells and were chemically analyzed in the laboratory; and
5. Surficial soil samples were obtained from two locations and were chemically analyzed in the laboratory.

A Regional Topography Map, Drawing C 11440-A1 and a Water Table Map, Drawing C 11440-1 accompany the text to illustrate site conditions.

SITE INVESTIGATION

A. Infield Investigation

1. Subsurface Exploration Program

Eight soil borings were performed at six locations during April, 1984 (in addition to Borings W-1, W-2 and W-3 which were performed during October, 1983) to assess subsurface conditions and to install monitoring wells. Six borings (W-4, W-5, W-6, W-7, W-10 and W-11) were standard penetration test (SPT) borings. Two borings (W-8 and W-9) were earth drilled to install shallow water table wells next to deeper SPT borings (Wells W-11 and W-10, respectively). Soil Boring Logs are presented in Appendix B.

Water table wells (W-4, W-6, W-7, W-8 and W-9) were constructed of 10-foot lengths of 2-inch diameter PVC well screen attached to 2-inch diameter threaded flush joint PVC well pipe. The borehole annulus was backfilled with flint sand and a bentonite seal was placed at ground surface. Locking steel protective casings were installed at all well locations. Piezometers (W-5, W-10, W-11) were similarly constructed, except that 5-foot lengths of 2-inch diameter PVC well screen were used and another 4 to 5 foot bentonite seal was placed several feet above the top of the well screen. Well construction details are presented in Appendix C. Monitoring well locations are shown on Drawing C 11440-1.

The well installation order was based on a assumed contamination potential. The contamination potential was determined based on previous water quality results at Wells W-1, W-2 and W-3; assumed groundwater flow toward the river; and assumed potential contamination sources. The apparent low contamination potential wells were installed first (first to last: W-8, W-11, W-7, W-10, W-9, W-6, W-4 and W-5). The borings were performed using the wash boring method in combination with driving casing. The wash boring was performed using clear water only. All wells were developed using oil free compressed air after well installation. No glue or solvents were used in well construction. The drilling equipment was thoroughly washed before drilling began at each well location.

The Illinois Environmental Protection Agency (IEPA) installed two groundwater monitoring wells in the site vicinity on May 15, 1984. The approximate locations of these two wells are shown on Drawings C 11440-1 and C 11440-A1. Soil Boring Logs and Well Installation Details are included in Appendix D.

2. Water Level Measurements

Groundwater level measurements were obtained on four occasions during the period from April 27 to June 21, 1984 by WEI. Water level measurements were also obtained at IEPA Wells G101 and G102 on June 21, 1984. In addition, river level measurements were obtained on May 17 and June 21, 1984 and pond level measurements on May 17, 1984. Water level elevations are presented in Table 1.

3. Well Location and Elevation Survey

All on-site monitoring wells were surveyed by level circuit to a vertical accuracy of ±0.01 foot (U.S.G.S Datum) by WEI. In addition, a staff gauge was set in the Rock River and pond water level reference points were established. Horizontal locations were established to an accuracy of ±1 foot by electronic distance measuring methods.

4. Groundwater Quality Sampling

Groundwater samples were obtained from Wells W-1 through W-10 on May 17, 1984, by WEI. Approximately four well volumes of water were removed during pre-bailing on May 3, 1984 and immediately prior to sampling on May 17, 1984. The wells were sampled in order of assumed increasing contamination potential (first to last sampled; W-8, W-1, W-7, W-10, W-9, W-6, W-2, W-4, W-5 and W-3). All wells were sampled using a stainless steel bailer with stainless steel cable. Bailers were thoroughly washed with trisodiumphosphate (TSP) and were rinsed twice with deionized water prior to sampling each well.

5. Soil Sampling for Chemical Analysis

Soil samples were obtained from both the storage yard area and the foundry sand disposal area on May 17, 1984. Sample locations were selected by Beloit Corporation personnel. Approximately 6 soil samples were obtained from each area and were composited for laboratory analysis. Sample locations are shown on Drawing C 11440-1.

B. Laboratory Investigation

1. Soils Classification

All soil samples collected during the subsurface investigation were visually classified by a staff hydrogeologist in the laboratory per the Unified Soils Classification System.

2. Groundwater Quality Analysis

Groundwater samples obtained on May 17, 1984 were analyzed for field pH, field specific conductivity, chloride, chemical oxygen demand (COD), total hardness, total organic carbon (TOC), cadmium, lead, manganese, mercury, total suspended solids (TSS) and volatile organic contaminants (VOC's). Results of the analyses are presented in Appendix E.

3. Soil Sample Chemical Analysis

Soil samples obtained from the storage yard area and foundry sand disposal area were subjected to a 24-hour leach test using Method SW-846, Section 7.0 and an EP Toxicity test. Each test consists of mixing 100 grams of soil sample with 2,000 milliliters solution (1:20 ratio) and shaking the solution for 24-hours. The solution used for the standard leach test is deionized water. The solution used for the EP Toxicity test is 1,600 milliliters deionized water and up to 400 ml 0.5 N acetic acid (total volume: 2,000 milliliters). The acetic acid is added periodically to maintain the solution pH at 5.0. Subsequent to shaking the solution is filtered through a 0.45 micron filter.

The leach test extract was analyzed for specific conductivity, pH, sodium, calcium, sulfate and chemical oxygen demand (COD). The EP Toxicity extract was analyzed for chromium, nickel, manganese, zinc, iron, copper and phenols. Results of the analyses are presented in Appendix F.

RESULTS OF INVESTIGATION

A. Geology

This site is located in an area of glacial outwash deposited during the retreat of the Green Bay ice lobe of the Wisconsin Stage glaciation. On-site subsoils generally consist of silty sand (SM), and silty gravel and sand (GM). The silty gravel and sand layer is encountered at depths ranging from 18 feet (754 feet USGS datum) at Wells W-8 and W-11 to 2.5 feet (741 feet USGS datum) at Well W-5. This layer varies in thickness from approximately 20 feet at Well W-11 to 13.5 at Well W-7. It appears that the silty gravel and sand unit slopes toward the river. The silty gravel and sand unit is underlain by a silty sand (SM) at all boring locations. A deposit consisting of alternating layers of very fine sand and sandy silt is present at Elevation 705-710 at Wells W-5, W-6 and W-7.

Depth to bedrock beneath the site is approximately 150 to 250 feet based on a published bedrock contour map of the area. The maximum depth to bedrock occurs in a bedrock valley beneath the southern portion of the site.

B. Groundwater Flow

The groundwater flow pattern in the site vicinity is influenced primarily by the amount of groundwater recharge due to precipitation and by the level of the Rock River, a groundwater discharge zone. Groundwater within the shallow sand and gravel aquifer flows away from the groundwater high located in the northern portion of the site toward the west, south and southeast, eventually discharging into the Rock River. A water table map based on water level measurements obtained on June 21, 1984 is presented on Drawing C 11440-1. Groundwater elevations are presented in Table 1.

The groundwater mound beneath the site appears to be asymmetrical, the southeastern flank being much longer than the western flank. The asymmetry is probably due to the difference in river elevations above (approximately 724-727 feet, USGS datum), and below (approximately 700 feet), the Rockton Power Plant spillway (see Drawing C 11440-A1).

The water table map shown on Drawing C 11440-1 represents high groundwater conditions during spring recharge. During fall and winter, when groundwater levels are lower, the shape and location of the groundwater high may change. In order to evaluate these possible seasonal changes, water level measurements could be obtained on a seasonal basis from on-site wells.

Based on water levels obtained on June 21, 1984, the horizontal groundwater gradient varies from approximately 0.003 ft/ft to 0.008 ft/ft in the site vicinity. Vertical groundwater gradients were slightly downward (0.002 ft/ft) at all well nest locations.

TABLE 1

GROUNDWATER AND RIVER ELEVATIONS

BLACKHAWK FACILITY
BELOIT CORPORATION

Well No.	(WEI No.)	TOC Steel	Elevation PVC	4-27-84	5-3-84	5-17-84	6-21-84
W-1	W-1	749.58	749.53	728.13	728.55	728.77	729.00
W-2	W-2	755.12	754.94	726.29	728.16	727.87	728.12
W-3	W-3	746.48	746.04	723.69	724.35	724.55	724.77
W-4	W-4	754.87	754.52	722.50	723.01	723.28	723.80
W-5	P-3A	746.54	746.38	723.93	724.26	724.46	724.74
W-6	W-5	747.66	747.61	727.17	727.31	726.90	726.63
W-7	W-7	751.22	751.20	730.02	730.37	730.15	728.96
W-8	W-6	774.49	--	--	--	729.61	730.11
W-9	W-8	754.67	754.62	729.32	729.82	730.03	729.15
W-10	P-8A	754.72	754.61	729.31	729.81	730.08	729.09
W-11	P-6A	774.55	774.42	729.45	729.64	729.61	730.08
G-101	--	--	760.00	--	--	--	717.54
G-102	--	--	763.22	--	--	--	723.14

	Gauge benchmark	River Elevation 5-24-84	6-21-84
Rock River - Staff Gauge	729.11	726.1	726.8
Rock River - USGS Station Rockton	707.94	--	700.8

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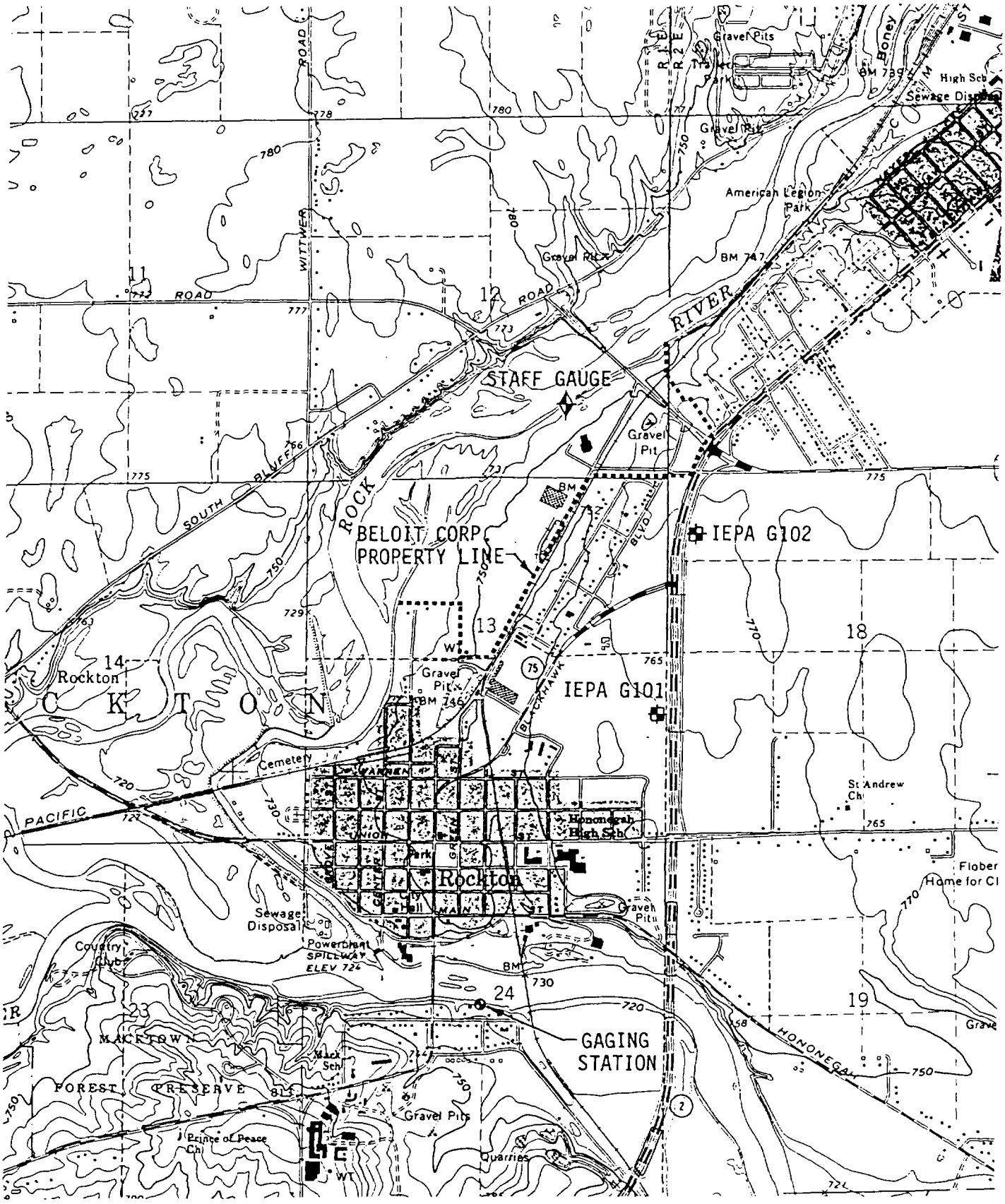

NOTE:

REGIONAL TOPOGRAPHY OBTAINED FROM USGS 7.5 MINUTE SOUTH BELOIT USGS QUADRANGLE MAP, DATED 1971.

REGIONAL TOPOGRAPHY

DWN MAS	APP'D AJS	DATE 7/12/84	C11440-A1

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BELOIT CORPORATION
BLACKHAWK FACILITY

Private water supply well construction reports were not acquired as part of this investigation. However, reports obtained by Beloit Corporation personnel indicate that private wells in the area, generally are terminated at 60-65 feet below ground surface and draw water from the sand and gravel aquifer.

The physical processes that control the rate of migration of solute in groundwater are advection and hydrodynamic dispersion. Advection is the component of solute movement due to groundwater flow and can be estimated using a modification to Darcy's Law. Hydrodynamic dispersion occurs due to mechanical mixing of solute particles and molecular diffusion and results in the solute spreading out from the path it would be expected to follow based on the groundwater flow direction and velocity alone. The rate of contaminant movement may be underestimated if only groundwater flow velocities are taken into account. However, velocities are straightforward to calculate and are useful as a first approximation.

The average groundwater velocity can be estimated as follows (Freeze and Cherry, 1979):

$$V = \frac{K}{n} * \frac{dh}{dl} * A$$

where: V = average linear groundwater velocity
K = subsoil permeability (estimate: $1x10^{-2}$-$1x10^{-4}$ cm/sec; 0.28-28 ft/day)
dh/dl = horizontal groundwater gradient (average: 0.005 ft/ft)
A = cross sectional area through which flow occurs (1 ft^2)
n = subsoil porosity (0.3)

The subsoil permeability range was estimated based on the results of field testing performed on similar subsoil materials since field permeability tests were not performed at the site. On-site permeability testing may not significantly narrow the range of subsoil permeabilities. The horizontal hydraulic gradient was based on the water table map. Subsoil porosity was estimated based on subsoils present at the site.

Resulting groundwater velocities range from approximately 0.005 ft/day to 0.5 ft/day. The estimated groundwater velocity range spans two orders of magnitude due to the range in estimated subsoil permeabilities.

C. Groundwater Quality

1. On-Site Monitoring Wells

a. Inorganic

Laboratory analysis of groundwater samples obtained on May 17, 1984 indicates elevated levels of several parameters at on-site monitoring wells compared to background water quality Monitoring Well W-8 (see Appendix E). Background Well W-8 indicated a slightly elevated level of specific conductivity and chloride which may be due in part to road salting of nearby Prairie Hill Road and State Highway 2.

Monitoring Wells W-1, W-6, W-7, W-9, W-10 indicate elevated levels of specific conductivity and, with the exception of Well W-6, chloride. Wells W-7, W-9 and W-10 are located near the plant parking lot and access roads, in areas where snow is piled in the winter. Well W-1 is located downgradient of the access road. It is very likely that the elevated specific conductivity and

chloride levels at these wells are due to salting of the parking lot and access roads during the winter. The elevated conductivity level at Well W-6 may be due, in part, to slightly elevated total hardness.

Total organic carbon (TOC) levels were generally low. Total suspended solids levels were generally moderately high to high at monitoring wells indicating the presence of silt from the aquifer, and low at the Plant Well.

Levels of cadmium, lead and mercury were below detection limits. Levels of manganese were above the EPA Secondary Drinking Water Standard (0.05 mg/l) which is set for aesthetic purposes (taste, color, odor and appearance) in 6 of the 11 wells sampled. Wells W-4, W-5 and Background Well W-8 indicated manganese levels (0.06 mg/l) only slightly above the secondary standards. Wells W-2, W-6 and Plant Well No. 1 indicated slightly higher levels. It appears that natural manganese levels may be somewhat elevated in the site vicinity based on these results.

b. Organics

Levels of volatile organic contaminants (VOC's) were below detection levels at all wells sampled with the exception of Wells W-1, W-3 and W-5. Well W-1 indicated 1,1 dichloroethylene at the detection limit (10 ug/l). Well W-3 indicated the presence of 1,1,1 trichloroethane (47 ug/l) and trichloroethylene (89 ug/l). Well W-5 indicated 1,1,1 trichloroethane (340 ug/l), trichloroethylene (35 ug/l) and 1,1,2,2 tetrachloroethylene (12 ug/l). Both Wells W-3 and W-5 are located downgradient of the plant and the storage yard

area. Deeper Well W-5 indicated a higher level of 1,1,1 trichloroethane than water table Well W-3. However, Well W-3 indicated a higher level of trichloroethylene. Analytical results are presented in Appendix E.

Tetrachloroethylene, 1,1,1 trichloroethane and trichloroethylene are organic solvents commonly used as cleaners and degreasers in industry. The 1,1 dichloroethylene is not used widely but appears to be a breakdown product of tetrachloroethylene and trichloroethylene. Tetrachloroethylene may also degrade to trichloroethylene.

Levels of VOC's measured in the May 17, 1984 samples were significantly lower than levels measured in the December 21 and February 16, 1984 samples from Wells W-1 and W-3. Well W-2 indicated levels of VOC's below detection on both February 16 and May 17, 1984. Methylene chloride was detected in samples obtained on December 21, 1983 but not on the other two sampling dates. Methylene chloride, a common laboratory reagent may be due in part to lab or sample bottle contamination, although the high levels observed in the December 21 sample indicated this may be an unlikely possibility. Methylene chloride was used previously, but is no longer used in plant operations.

Levels of VOC's in on-site wells are relatively low. These levels are compared to U.S. EPA health criteria in Table 2. These health criteria are estimates of concentrations which are not expected to produce adverse effects in humans. The criteria are generally regarded as informal guidelines rather than formal recommendations for regulatory action.

TABLE 2

COMPARISON OF RECOMMENDED HEALTH
CRITERIA AND ON-SITE VOC CONCENTRATIONS

	Recommended Health Criteria (ppb)	Concentration in On-Site Wells (ug/l)		
		W-1	W-3	W-5
1,1 - Dichloroethane	NA	10	--	--
1,1,1 - Trichloroethane	1070	--	47	340
Trichloroethylene	45	--	89	35
1,1,2,2 Tetrochloroethylene	20	--	--	12

NA - Not Available

-- Below Detection

It is evident that only Well W-3 indicates a VOC level higher than the recommended health criteria. There are no private water supply wells located downgradient of impacted Wells W-1, W-3 and W-5. In addition, it appears that shallow groundwater discharges into the Rock River approximately 1,000 feet downgradient of these three wells. It is recognized that recommended health criteria are not meant to represent levels up to which contamination is acceptable. However, based on the level of VOC's present in Wells W-1, W-3 and W-5 and their location in the groundwater flow system with respect to private water supplies, it does not appear that groundwater impact at these well locations poses a threat to public health.

However, it appears that impacted groundwater is leaving beneath the site boundary in the vicinity of Wells W-3 and W-5. The lateral and vertical extent of the impact has not been defined.

2. Off-Site Private Wells

Private water supply wells in the site vicinity were not sampled as part of this investigation. However, the IEPA collected and analyzed samples from homes east of the plant, along Watts Avenue, for VOC's on December 8, 1982; June 8 and August 9, 1983; and January 24, 1984. In addition, the Winnebago County Health Department collected and analyzed samples for purgeable priority pollutants on October 28, 1982. These results were obtained from the IEPA by WEI and are summarized in Appendix G. Locations of private wells sampled are shown on Drawing C 11440-1.

Levels of 1,1 dichloroethylene; 1,1 dichloroethane; 1,1,1 trichloroethane; trichloroethylene; bromoform; and 1,1,2,2 tetrachloroethylene were detected in the private well samples. Only the six wells located on the southern end of Watts Avenue showed impacts. Impacted wells are shown on Drawing C 11440-1. Levels of bromoform, 1,1,1 trichloroethane, trichloroethylene and 1,1,2,2 tetrachloroethylene were below recommended health criteria. Recommended health criteria are included in Table 1 with the exception of bromoform and 1,1 dichloroethylene which are 100 ppb and 10 ppb respectively. Samples obtained from 918 Watts Avenue exceeded the recommended health criteria for 1,1 dichloroethylene on 10/28/83. Samples from 910 and 918 exceeded the recommended health criteria for 1,1 dichloroethylene on 1/24/84.

Levels of 1,1,1 trichloroethane, trichloroethylene and 1,1,2,2 tetrachloroethylene were also detected in on-site monitoring wells (see previous discussion). 1,1 dichloroethylene and 1,1 dichloroethane were not detected at on-site wells but are degradation products of tetrachloroethylene and 1,1,1

trichloroethane, respectively, compounds found in on-site wells. Bromoform was not detected at on-site wells and has never been used in plant operations.

D. Soil Sample Analyses

Analysis of the 24-hour leach test extract indicated relatively low levels of measured parameters for both samples obtained from the storage yard area and the foundry sand disposal area. This indicates that the foundry sand and soil from the storage yard area are not likely to contribute significant amounts of sodium, calcium, and sulfate to the groundwater under neutral pH conditions (pH:7). Results of the EP Toxicity test indicate that manganese and a small amount of zinc may be leached from the soil in the storage area at low pH (pH:5).

Based on the generally low levels of analyzed parameters in the 24-hour leach test extract and EP Toxicity test extract, it does not appear that the foundry sand and soils in the storage yard area would contribute significant amounts of the chemicals analyzed to the groundwater. Analytical results are presented in Appendix F.

DISCUSSION OF POTENTIAL CONTAMINATION SOURCES

There are a number of potential contamination sources which may be associated with either or both inorganics and VOC's present in on-site Wells W-1, W-3 and W-5 and VOC's present in the private water supply wells.

Possible sources include:

a. A gravel pit temporarily used for dumping on the north end of Beloit Corporation property,
b. Beloit Corporation foundry sand disposal area,
c. South Beloit City dump,
d. Blackhawk facility plant and/or storage yard area,
e. United Recovery facility,
f. Road salt,
g. Fiber disposal area.

A. Old Gravel Pit

The old gravel pit is located between Blackhawk Boulevard and the railroad tracks on the northern edge of the site. Unauthorized dumping of household rubbish and construction debris occurred in the pit for a limited period of time. All refuse has been removed, with the exception of some concrete rubble, by Beloit Corporation. The old gravel pit is an unlikely source of contamination at Wells W-3, W-5 and the private wells due to the limited disposal period, the nature of materials disposed of and the position of the pit in the groundwater flow system. Groundwater flowing beneath the gravel pit would likely discharge into the Rock River north of the impacted areas.

B. Foundry Sand Disposal Area

The foundry sand disposal area, may be a possible source of VOC's at Wells W-3 and W-5, although this appear unlikely. The disposal area is upgradient of Wells W-3 and W-5, as well as Well W-6 which indicated levels of VOC's below detection. Previous waste characterization studies have been performed on the foundry sand but did not include VOC's. The foundry sand disposal area does not appear to be a source of VOC's at private water supply wells since it is not located upgradient of these wells.

C. Old South Beloit City Dump

The old South Beloit City Dump is located several miles east of the site and would not appear to be a likely source based on groundwater flow direction. The site does not appear to be downgradient of the old City Dump.

D. Storage Yard Area

The Blackhawk facility storage yard area may be a source of VOC's present in on-site Wells W-3 and W-5. The storage area presently contains scrap metal, pipe and miscellaneous equipment from the plant. No chemicals are presently stored in this area. Tetrachloroethylene and its degradation product, trichloroethylene, have been identified in Wells W-3 and W-5. Beloit Corporation previously used methylene chloride and tetrachloroethylene in their operation based on conversations with plant personnel. Conversations with plant personnel indicated that barrels were stored in this area in the past. However, it is not clear whether these barrels contained these organic solvents.

Wells W-3 and W-5 are located downgradient of the storage yard area and any chemical spillage in this area could migrate to these wells. The estimated travel time for contaminants to migrate from the storage area to Wells W-3 and W-5 based on flow velocities only, ranges from 6 to 600 years. Actual travel times are probably on the lower side of the range due to the previously discussed effects of hydrodynamic dispersion. This indicates that possible chemical spillage in the storage yard area sometime during the plant history, could reach the impacted on-site wells.

The storage yard area is also located upgradient of the impacted private water supply wells along Watts Avenue based on the June 21, 1984 Water Table Map (Drawing C 11440-1). Monitoring Well W-2 is located approximately midway between the storage yard area and the impacted private water supply wells on the south end of Watts Avenue. Samples from Well W-2 have not indicated VOC's during the last two sampling periods. Based on this information, it

does not appear that a plume of impacted groundwater is moving from the storage yard area to the south and southeast toward the private water supply wells. However, it is possible that impacted groundwater could migrate from the eastern portion of the storage yard area and leave the site north of Well W-2.

E. United Recovery Facility

The abandoned United Recovery facility reportedly reprocessed chemicals and scrap metal. Apparently, this process resulted in the recovery of chemicals of unknown identity.

The facility is an unlikely source of VOC's present in on-site Wells W-3 and W-5. Groundwater beneath United Recovery appears to flow toward the southeast away from the impacted monitoring wells.

However, the facility may be a source of VOC's present in nearby private wells since the facility is located cross-gradient and in close proximity to the impacted wells. Complaints submitted to the IEPA by nearby residents alleged that oil and waste chemicals were dumped onto the ground and drainage ditches behind the facility (see Appendix G).

These oils and waste chemicals may have entered the groundwater and migrated toward the private wells. The pumping of private wells along Watts Avenue

may create a groundwater gradient toward the wells which is not represented on the water table map. This gradient could induce migration of contaminants from the nearby United Recovery Facility.

F. Road Salting

Elevated levels of specific conductivity and chloride at Wells W-1, W-6 (conductivity only), W-7, W-9 and W-10 may be due, in part, to road and parking lot salting during the winter. These wells are located in areas which may receive direct runoff from roads and parking lots. Road salting is not a potential source of VOC's

G. Fiber Disposal Area

The fiber disposal area does not appear to be a possible source of VOC's present at either Wells W-3 and W-5 or the private wells. Fiber material dredged from the on-site ponds was land spread in this area approximately 2 years ago on a one-time basis only. Analysis of fiber material from the ponds indicated levels of 1,1,1 trichloroethane, trichloroethylene and tetrachloroethylene below 10 ppb. Therefore this material does not appear to be a source of VOC's.

CONCLUDING REMARKS

We trust that this report meets your current needs. We are available to discuss information contained in the report at your convenience.

Sincerely,

WARZYN ENGINEERING INC.

Alan J. Schmidt
Project Hydrogeologist

Roger C. Cooley, P.E.
Project Manager

AJS/RCC/blc
[blc-29-7]

WARZYN ENGINEERING INC

REFERENCES

Freeze, R.A. and J.A. Cherry, 1979, "Groundwater", Prentice-Hall, Inc., Englewood Cliffs, New Jersey, pp. 70-71.

AJS/blc
[blc-29-7]

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APPENDIX A

SUBSURFACE INVESTIGATION - GENERAL REMARKS

FIELD METHODS FOR EXPLORATION AND SAMPLING SOILS

LOG OF TEST BORING - GENERAL NOTES

UNIFIED SOIL CLASSIFICATION SYSTEM

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Subsurface Investigation

GENERAL REMARKS

We have endeavored to evaluate subsurface conditions and physical properties of the subsoil as revealed by the borings and laboratory testing. A problem inherent in this evaluation is the variability in engineering properties within soil strata involved, and specifically in any location variation in the soil which is located between borings. Due to natural or man-made causes, subsurface conditions may change with time.

Conclusions drawn and recommendations given in this report are for a specific proposed use of this site. They are our opinions and are based upon conditions that existed at the boring locations and such parameters as proposed site usage, soil loading, elevations, etc.

Since subsurface conditions depend on seasonal moisture variations, frost action, construction methods, and the inherent natural variations, careful observations must be made during construction. These should be brought to our attention as it may be necessary to modify the conclusions and recommendations presented herein.

FIELD METHODS
for
EXPLORATION AND SAMPLING SOILS

A. Boring Procedures Between Samples

The bore hole is extended downward, between samples, by a continuous flight auger, driven and washed-out casing, or rotary boring with drilling mud or water.

B. Standard Penetration Test and Split-Barrel Sampling of Soils (ASTM* Designation: D 1586)

This method consists of driving a 2" outside diameter split barrel sampler using a 140 pound weight falling freely through a distance of 30 inches. The sampler is first seated 6" into the material to be sampled and then driven 12". The number of blows required to drive the sampler the final 12" is recorded on the log of borings and known as the Standard Penetration Resistance. Recovered samples are first classified as to texture by the driller. Later, in the laboratory the driller's classification is reviewed by a soils engineer who examines each sample.

C. Thin-walled Tube Sampling of Soils (ASTM* Designation: D 1587)

This method consists of forcing a 2" or 3" outside diameter thin wall tube by hydraulic or other means into soils, usually cohesive types. Relatively undisturbed samples are recovered.

D. Soil Investigation and Sampling by Auger Borings (ASTM* Designation: D 1452)

This method consists of augering a hole and removing representative soil samples from the auger flight or bucket at 5'0" intervals or with each change in the substrata. Relatively disturbed samples are obtained and its use is therefore limited to situations where it is satisfactory to determine approximate subsurface profile.

E. Diamond Core Drilling for Site Investigation (ASTM* Designation: D 2113)

This method consists of advancing a hole in hard strata by rotating downward a single tube or double tube core barrel equipped with a cutting bit. Diamond, tungsten carbide, or other cutting agents may be used for the bit. Wash water is used to remove the cuttings. Normally a 2" O.D. by 1 3/8" I.D. coring bit is used unless otherwise noted. The rock or hard material recovered within the core barrel is examined in the field and laboratory. Cores are stored in partitioned boxes and the length of recovered material is expressed as a percentage of the actual distance penetrated.

*American Society for Testing and Materials, Philadelphia, Pennsylvania

LOG OF TEST BORING

General Notes

Descriptive Soil Classification

GRAIN SIZE TERMINOLOGY

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles	3" to 12"	3" to 12"
Gravel: Coarse	¾" to 3"	¾" to 3"
Fine	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse	2.00 mm to 4.76 mm	#10 to #4
Medium	0.42 mm to 2.00 mm	#40 to #10
Fine	0.074 mm to 0.42 mm	#200 to #40
Silt	0.005 mm to 0.074 mm	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

GENERAL TERMINOLOGY

Physical Characteristics
Color, moisture, grain shape, fineness, etc.

Major Constituents
Clay, silt, sand, gravel

Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.

Geologic Origin
Glacial, alluvial, eolian, residual, etc.

RELATIVE DENSITY

Term	"N" Value
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

RELATIVE PROPORTIONS OF COHESIONLESS SOILS

Proportional Term	Defining Range By Percentage of Weight
Trace	0%- 5%
Little	5%-12%
Some	12%-35%
And	35%-50%

CONSISTENCY

Term	q_u-tons/sq. ft.
Very Soft	0.0 to 0.25
Soft	0.25 to 0.50
Medium	0.50 to 1.0
Stiff	1.0 to 2.0
Very Stiff	2.0 to 4.0
Hard	Over 4.0

ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	Loss on Ignition
Non Organic	Less than 4%
Organic Silt/Clay	4-12%
Sedimentary Peat	12-50%
Fibrous and Woody Peat	More than 50%

PLASTICITY

Term	Plastic Index
None to Slight	0-4
Slight	5-7
Medium	8-22
High to Very High	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" pentrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

Symbols

DRILLING AND SAMPLING

CS—Continuous Sampling
RC—Rock Coring: Size AW, BW, NW, 2" W
RQD—Rock Quality Designator
RB—Rock Bit
FT—Fish Tail
DC—Drove Casing
C—Casing: Size 2½", NW, 4", HW
CW—Clear Water
DM—Drilling Mud
HSA—Hollow Stem Auger
FA—Flight Auger
HA—Hand Auger
COA—Clean-Out Auger
SS—2" Diameter Split-Barrel Sample
2ST—2" Diameter Thin-Walled Tube Sample
3ST—3" Diameter Thin-Walled Tube Sample
PT—3" Diameter Piston Tube Sample
AS—Auger Sample
WS—Wash Sample
PTS—Peat Sample
PS—Pitcher Sample
NR—No Recovery
S—Sounding
PMT—Borehole Pressuremeter Test
VS—Vane Shear Test
WPT—Water Pressure Test

LABORATORY TESTS

q_p—Penetrometer Reading, tons/sq. ft.
q_u—Unconfined Strength, tons/sq. ft.
W—Moisture Content, %
LL—Liquid Limit, %
PL—Plastic Limit, %
SL—Shrinkage Limit, %
LI—Loss on Ignition, %
D—Dry Unit Weight, lbs./cu. ft.
pH—Measure of Soil Alkalinity or Acidity
FS—Free Swell, %

WATER LEVEL MEASUREMENT

▽—Water Level at time shown
NW—No Water Encountered
WD—While Drilling
BCR—Before Casing Removal
ACR—After Casing Removal
CW—Caved and Wet
CM—Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

UNIFIED SOIL CLASSIFICATION SYSTEM

COARSE-GRAINED SOILS

(More than half of material is larger than No. 200 seive size.)

GRAVELS More than half of coarse fraction larger than No. 4 sieve size	**Clean Gravels** (Little or no fines)	
	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
	Gravels with Fines (Appreciable amount of fines)	
	GM_u^d	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS More than half of coarse fraction smaller than No. 4 sieve size	**Clean Sands** (Little or no fines)	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with Fines (Appreciable amount of fines)	
	SM_u^d	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures

FINE-GRAINED SOILS

(More than half of material is smaller than No. 200 sieve.)

SILTS AND CLAYS Liquid limit less than 50%	**ML**	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit greater than 50%	**MH**	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	**PT**	Peat and other highly organic soils

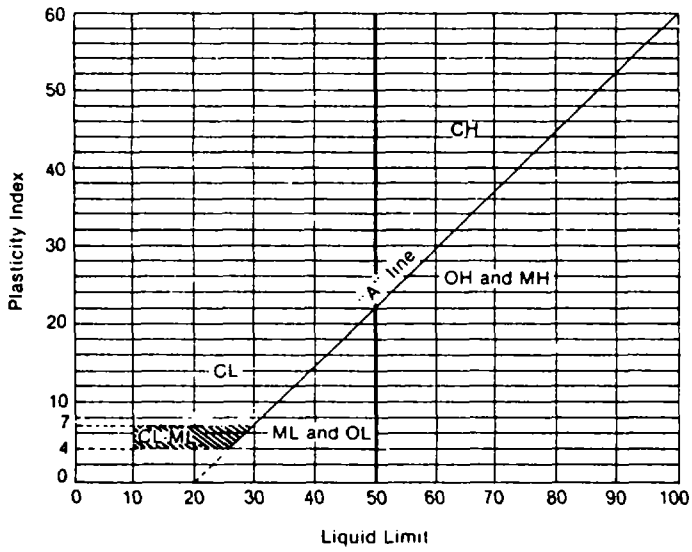
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for SW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 per cent	GW, GP, SW, SP
More than 12 per cent	GM, GC, SM, SC
5 to 12 per cent	Borderline cases requiring dual symbols

PLASTICITY CHART



For classification of fine-grained soils and fine fraction of coarse-grained soils.

Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols.

Equation of A-line: PI = 0.73 (LL - 20)

APPENDIX B

SOIL BORING LOGS
W-1 THROUGH W-11

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LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No. 1

Surface Elevation 746.9

Job No. C 11440/8000145

Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						Black TOPSOIL					
					5	Very Fine to Fine to Medium SAND and GRAVEL					
					10						
					15						
					20						
					25						
					30						
					35						
					40	End Boring at 37'					
						Install well at 37'					

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start 10/27/83 Complete 10/27/83

Crew Chief SJW Rig 919

Drilling Method DC(4") 0-10'
FA 0-9'; WB 0-37';
ED 9-37'

M-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No. 2

Surface Elevation 752.9

Job No. C 11440/800145

Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						Black TOPSOIL					
					5	Very Fine to Fine to Medium SAND and GRAVEL, Trace to Little Silt					
					10						
					15						
					20						
					25						
					30						
					35						
					40	End Boring at 37' Install well at 37'					

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start 10/26/84 Complete 10/26/84

Crew Chief SJW Rig 919

Drilling Method FA 0-9'
DC(4") 0-9'; WB 9-37'
ED 9-37'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No. 3

Surface Elevation 743.8

Job No. C 11440/800145

Sheet 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						Black TOPSOIL					
					5	Very Fine to Fine to Medium SAND with GRAVEL, Trace to Little Silt					
					10						
					15						
					20	SAND					
					25						
					30						
					35						
					40	End Boring at 37' Installed 37' well with 10' screen and 2 1/2' up.					

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start 10/26/83 Complete 10/26/83

Crew Chief SJW Rig 919

Drilling Method FA 0-10' DC(4") 0-10'; WB 10-37' ED 10-37'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-4
Surface Elevation: 752.7
Job No.: C 11440/800145
Sheet: 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				qp	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Dark Brown Sandy SILT					
						Brown Fine to Medium SAND, Some Gravel, Little to Some Silt (SM)					
1	SS	X	M	18	5						
2	SS	X	M	100	10						
						Brown Silty Fine to Medium GRAVEL and SAND (GM)					
3	SS	X	M	100	15						
4	SS	NR		100	20						
5	SS	X	W	100	25						
6	SS	NR		100	30						
						Brown Silty Very Fine to Fine SAND (SM)					
7	SS	X	W	75	35						
8	SS	X	W	100	40	Install Well at 38'					
						End Boring at 40'					

WATER LEVEL OBSERVATIONS

While Drilling: _____
Upon Completion of Drilling: _____
Time After Drilling: 1 1/2 hour
Depth to Water: 30'
Depth to Cave In: _____

GENERAL NOTES

Start: 4/23/84 Complete: 4/23/84
Crew Chief: SW/MG Rig: 9100
Drilling Method:
DC(4") 0-34'
WB w/CW 0-40'
SPT 0-40'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No. W-5 (P-3A)
Surface Elevation 743.7
Job No. C-11440/800145
Sheet 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q_u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Dark Brown Sandy SILT					
1	SS	X	M	42	5	Brown Silty Medium to Coarse GRAVEL and SAND (GM)					
2	SS	X	M	100	10						
3	SS	X	M	60	15						
4	SS	NR		100	20	Brown Fine to Medium SAND, Trace to Little Silt, Trace to Little Gravel (SP-SM)					
5	SS	X	W	45	25						
6	SS	X		100	30						
7	SS	X	M	63	35	Orange Color at 34'					
						Brown Sandy SILT, Trace Clay (ML)					
8	SS	X	W	13	40	Gray Finely Laminated SILT and Fine SAND, Occasional Layers Organic Silt					
9	SS	X	W	54	45	Brown Very Fine to Fine SAND, Little Silt (SM)					

(Continued)

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-5 (P-3A)

Surface Elevation: 743.7

Job No.: C 11440/800145

Sheet: 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
					50	Brown Very Fine to Fine SAND, Little Silt (SM)					
10	SS	NR		65							
11	SS	X		60/9"	55	Coarse Sand at 55'					
					60	End Boring at 58'					
						Install Piezometer at 52.5'					
					65						
					70						
					75						
					80						
					85						

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start 4/24/84 Complete 4/24/84

Crew Chief SJW/MG Rig 9100

Drilling Method DC 0-34'
WB w/CW 0-58'
SPT 0-55'

W-5

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-6(W-5)
Surface Elevation: 745.2
Job No.: C-11440/800145
Sheet: 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						Dark Brown Sandy SILT (ML)					
1	SS	X	M	11	5						
						Brown Silty Fine to Coarse GRAVEL and SAND (GM)					
2	SS	X	M	38	10						
3	SS	X	M	32	15						
4	SS	X	W	22	20	Brown Silty Fine to Medium SAND, Little Gravel (SM)					
5	SS	X	M	100	25	Harder Drilling at 25'					
6	SS	X	M	73	30						
7	SS	X	M	76	35						
						Gray Very Silty Fine to Medium SAND (SM) to Gray Sandy Silt (ML)					
8	SS	X	M	100	40	Install Well at 38.4'					
						End Boring at 40'					

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start: 4/20/84 Complete: 4/20/84
Crew Chief: SW/MG Rig: 9100
Drilling Method: DC(4") 0-19'
WB w/CW 0-40'
SPT 0-40'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-7
Surface Elevation: 749.1
Job No.: C-11440/800145
Sheet: 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE No.	Type	Recovery	Moisture	N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu	W	LL	PL	D
						Dark Brown Silty Sandy TOPSOIL					
1	SS	X	M	52	5						
2	SS	X	M	100	10	Brown Silty Medium GRAVEL and Fine to Coarse SAND (GM)					
3	SS	X	M	90	15						
4	SS	X	W	25	20	Light Brown Silty Very Fine to Fine SAND, Trace Gravel (SM)					
5	SS	X	M-W	76	25	Pink to Brown Very Silty Very Fine to Medium SAND, Trace to Little Gravel, Occasional Very Thin Layers with Clay (SM)					
6	SS	X	W	60/8"	30	Brown Silty Fine to Medium SAND, Little Gravel (SM)					
7	SS	X	W	60/8"	35	Brown Silty Very Fine to Medium SAND, Trace Gravel (SM)					
						Brown Silty Very Fine SAND (SM) to Brown Sandy Silt (ML)					
					40	End Boring at 40'					

WATER LEVEL OBSERVATIONS

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start: 4/17/84 Complete: 4/17/84
Crew Chief: SW/MG Rig: 9100
Drilling Method: DC(4") 0-23'
WB w/CW 0-40'
SPT 0-40'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-8(W-6)
Surface Elevation: 772.3
Job No.: C11400/800145
Sheet: 1 of 1

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		qu	W	LL	PL	D
					10	For description of subsurface conditions refer to Boring Log W-11					
					20						
					30						
					40						
					50						
						Install Well at 54'					
					60	End Boring at 55'					
					70						
					80						

WATER LEVEL OBSERVATIONS

While Drilling: _____
Upon Completion of Drilling: _____
Time After Drilling: 24 hours
Depth to Water: 36'
Depth to Cave In: _____

GENERAL NOTES

Start: 4/10/84 Complete: 4/10/84
Crew Chief: SJW Rig: 9100
Drilling Method: DC(4") 0-40'
WB w/ CW 0-40'
ED 0-40'

W-1

WARZYN ENGINEERING INC

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-9 (W-8)

Surface Elevation: 752.7

Job No.: C-11440/800145

Sheet: 1 of 1

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		qu	W	LL	PL	D
						For complete description of subsoil conditions see Boring Log W-10					
					5						
					10						
					15						
					20						
					25						
					30						
					35	End Boring at 34.5'					
					40	Install well at 34.5'					

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start: 4/19/84 Complete: 4/19/84

Crew Chief: SJW Rig: 9100

Drilling Method: DC(4") 0-29';
WB w/CW 0-34.5'
ED 0-34.5'

W-1

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-10 (P-8A)

Surface Elevation: 752.6

Job No: C 11440/800145

Sheet: 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		q_u	W	LL	PL	D
						Dark Brown Silty SAND (SM)					
1	SS	X	M	2	5	Brown Fine to Medium SAND, Some Silt (SM)					
2	SS	X	M	16	10	Light Brown Silty Very Fine SAND (SM)					
3	SS	X	M	100	15	Brown Silty Fine to Coarse GRAVEL and SAND (GM)					
4	SS	X	M	61	20						
5	SS	X		47	25	Light Brown Silty Very Fine to Fine SAND, Trace Gravel (SM)					
6	SS	X	M	90	30						
7	SS	X	M	43	35						
8	SS	X	M	100	40						
9	SS	X	M	58	45						

(Continued)

WARZYN ENGINEERING INC

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-10 (P-8A)

Surface Elevation: 752.6

Job No.: C11440/800145

Sheet: 2 of 2

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q_u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Light Brown Silty Very Fine to Fine SAND, Trace Gravel (SM)					
10	SS	X	M	88	50						
						Brown Fine to Medium SAND, Trace to Little Silt, Trace Gravel (SM-SP)					
11	SS	X	W	100	55						
					60	End Boring at 60'					
					65						
					70						
					75						
					80						
					85						

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start: 4/18/84 Complete: 4/18/84

Crew Chief: SW/MG Rig: 9100 DC (0-29')

Drilling Method: WB w/CW 0-60'
SPT 0-55'

WS

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-11(P-6A)

Surface Elevation: 771.9

Job No.: C 11440/800145

Sheet: 1 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture				q_u	W	LL	PL	D
No.	Type	↓	↓	N	Depth						
						Brown Silty Fine to Medium SAND (SM)					
1	SS	X	M	7	5						
2	SS	X	M	16	10	Brown Fine to Coarse SAND, Little Silt, Trace to Little Gravel (SM)					
3	SS	X	M	60	15	Some Gravel at 15'					
4	SS	X	M	29	20						
5	SS	NR		37	25	Brown Fine to Coarse Silty GRAVEL and SAND (GM)					
6	SS	X	W	60	30						
7	SS	NR	W	37	35						
8	SS	X	W	60	40	Brown Fine to Medium SAND, Little to Some Silt, Trace Gravel (SM)					
9	SS	X	W	100	45						

(Continued)

WARZYN ENGINEERING INC

LOG OF TEST BORING

Project: Beloit Corporation

Location: Rockton, Illinois

Boring No.: W-11 (P-6A)

Surface Elevation:

Job No.: C 11440/800145

Sheet: 2 of 2

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SAMPLE						VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
Recovery			Moisture								
No.	Type	↓	↓	N	Depth		qu	W	LL	PL	D
						*					
						Brown Silty Very Fine to Medium SAND, Trace Gravel (SM)					
10	SS	X	M	100	50						
11	SS	X	M	100	55						
12	SS	X	M	100	60						
						Install Piezometer at 62'					
						End Boring at 62'					
					65						
						*Brown Fine to Medium SAND, Little to Some Silt, Trace Gravel (SM)					
					70						
					75						
					80						
					85						

WATER LEVEL OBSERVATIONS

While Drilling

Upon Completion of Drilling

Time After Drilling

Depth to Water

Depth to Cave In

GENERAL NOTES

Start: 4/10/84 Complete: 4/10/84

Crew Chief: SW/MG Rig: 9100

Drilling Method: DC(4") 0-49'
WB w/CW 0-62'
SPT 0-62'

W-5

APPENDIX C

WELL INSTALLATION DETAILS
WELLS W-1 THROUGH W-11

WARZYN
ENGINEERING INC

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800006

BORING NO. 1

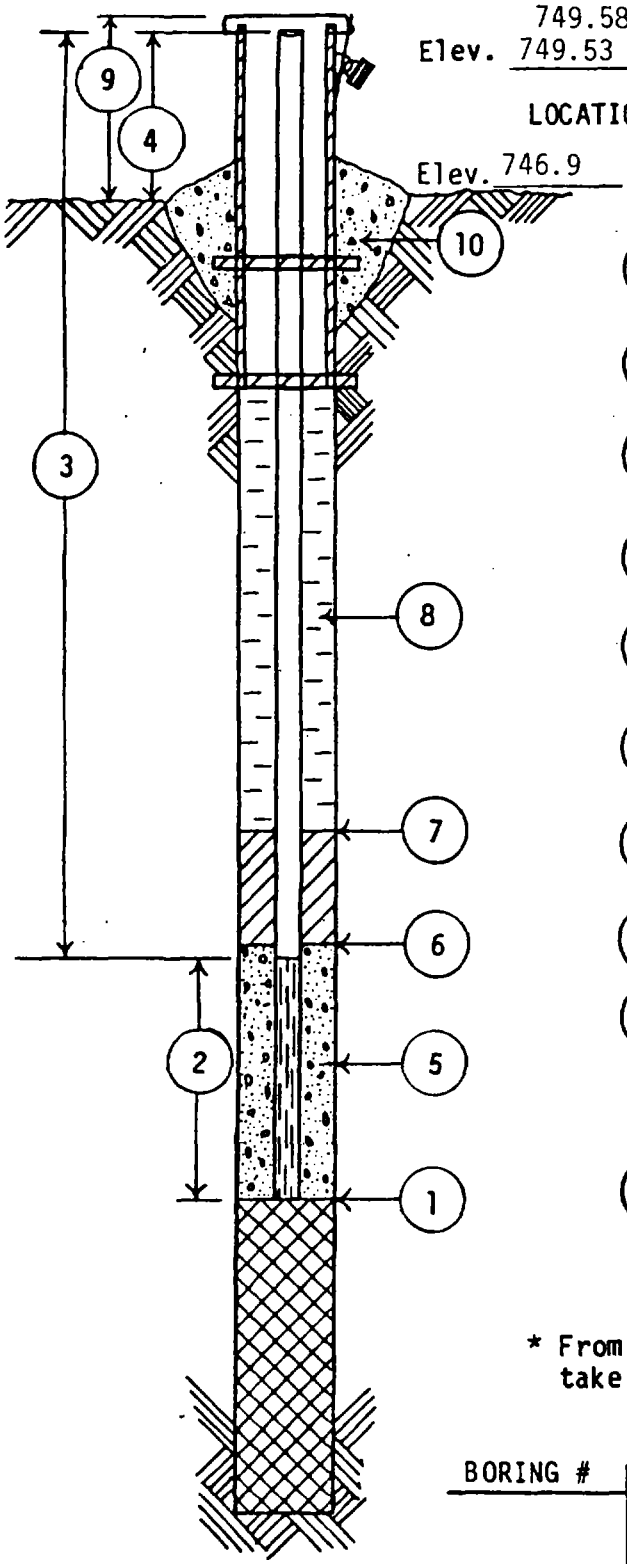
DATE 10/27/83

Elev. 749.58 Steel / 749.53 PVC CHIEF SJW

LOCATION Beloit Corporation; Rockton, Illinois

Elev. 746.9

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE 37 FEET

(2) LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 29.5 FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL 4 FEET

(7) DEPTH OF UPPER OR TOP SEAL 0 FEET

(8) TYPE OF BACKFILL Spoils

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2.5'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800006

BORING NO. 2

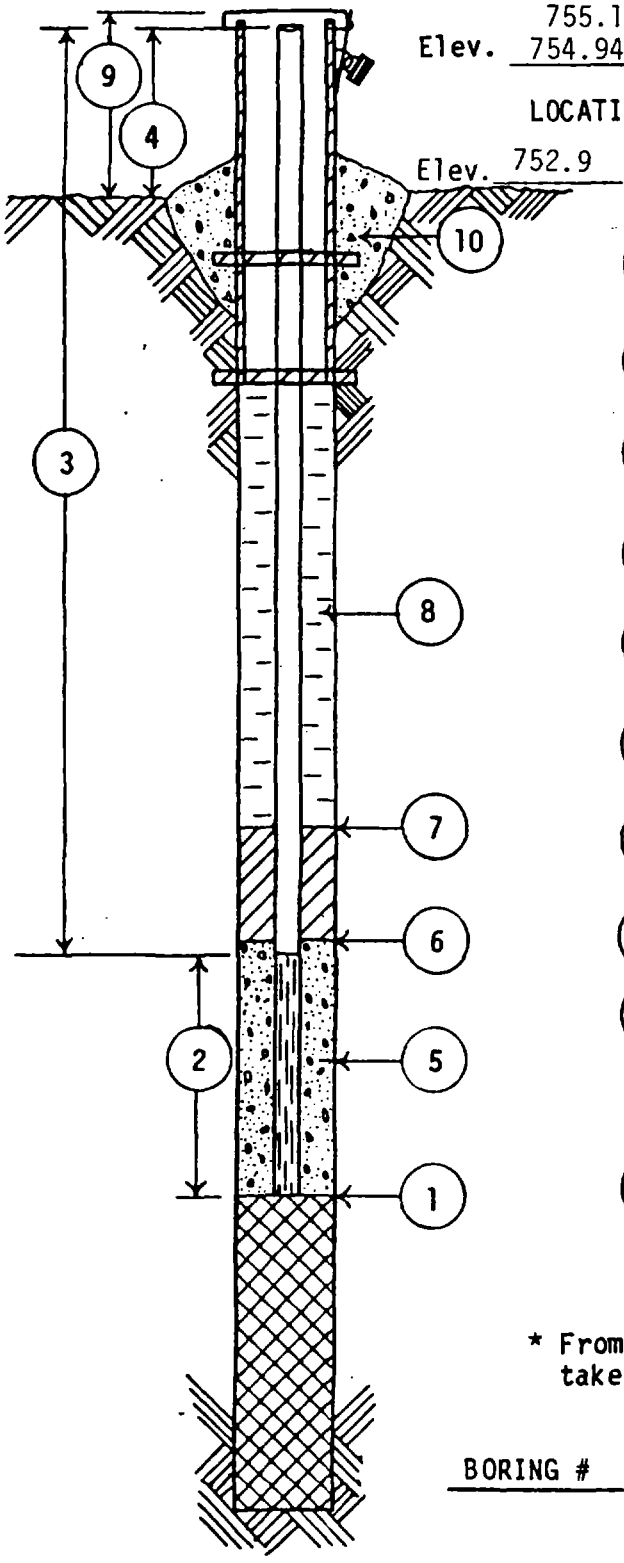
DATE 10/26/83

Elev. 755.12 Steel / 754.94 PVC CHIEF SJW

LOCATION Beloit Corporation; Rockton, Illinois

Elev. 752.9

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE 37 FEET

(2) LENGTH OF WELL POINT, (WELL SCREEN), OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 29 FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND 2 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL 4 FEET

(7) DEPTH OF UPPER OR TOP SEAL 0 FEET

(8) TYPE OF BACKFILL Spoils

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800006

BORING NO. 3

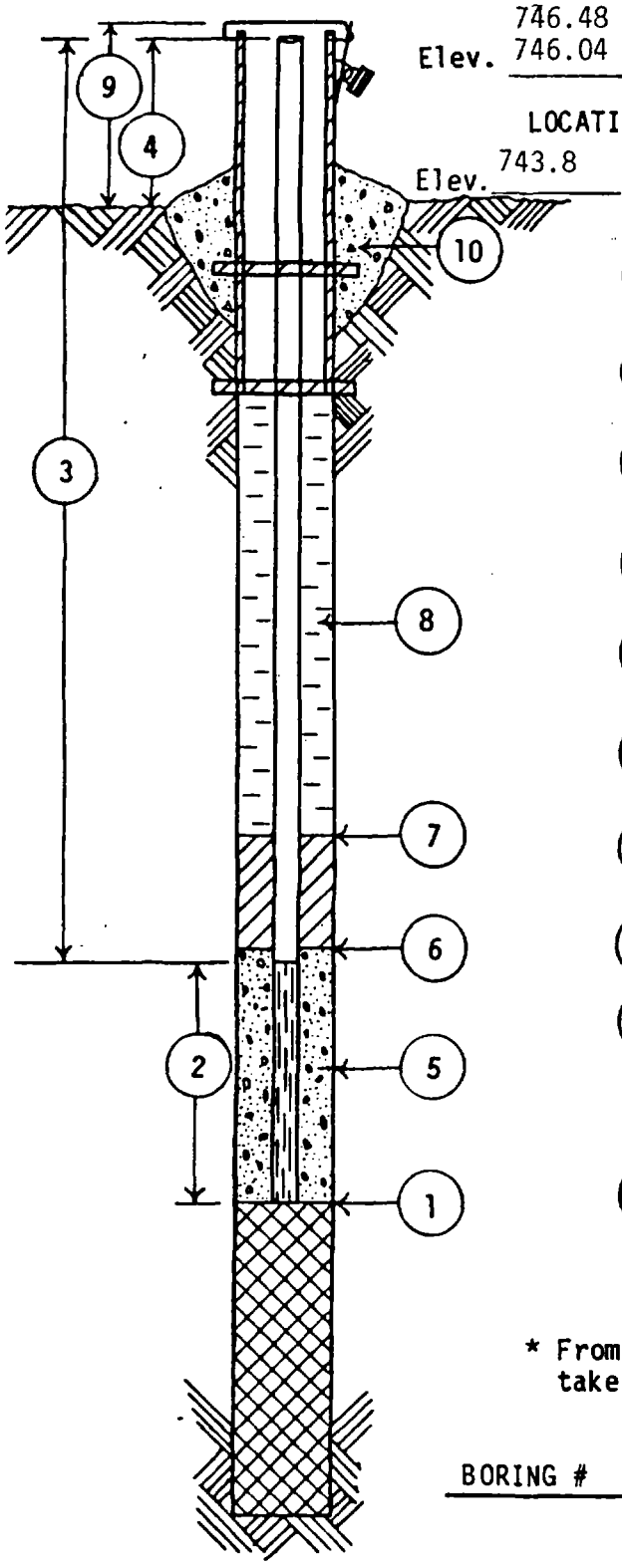
DATE 10/26/83

Elev. 746.48 Steel 746.04 PVC CHIEF SJW

LOCATION

Elev. 743.8

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE 37 FEET

(2) LENGTH OF WELL POINT (WELL SCREEN), OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 29.5 FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND 2.5 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand (Spoil)

(6) DEPTH OF LOWER OR BOTTOM SEAL 4 FEET

(7) DEPTH OF UPPER OR TOP SEAL 0 FEET

(8) TYPE OF BACKFILL Spoils

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2.5'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

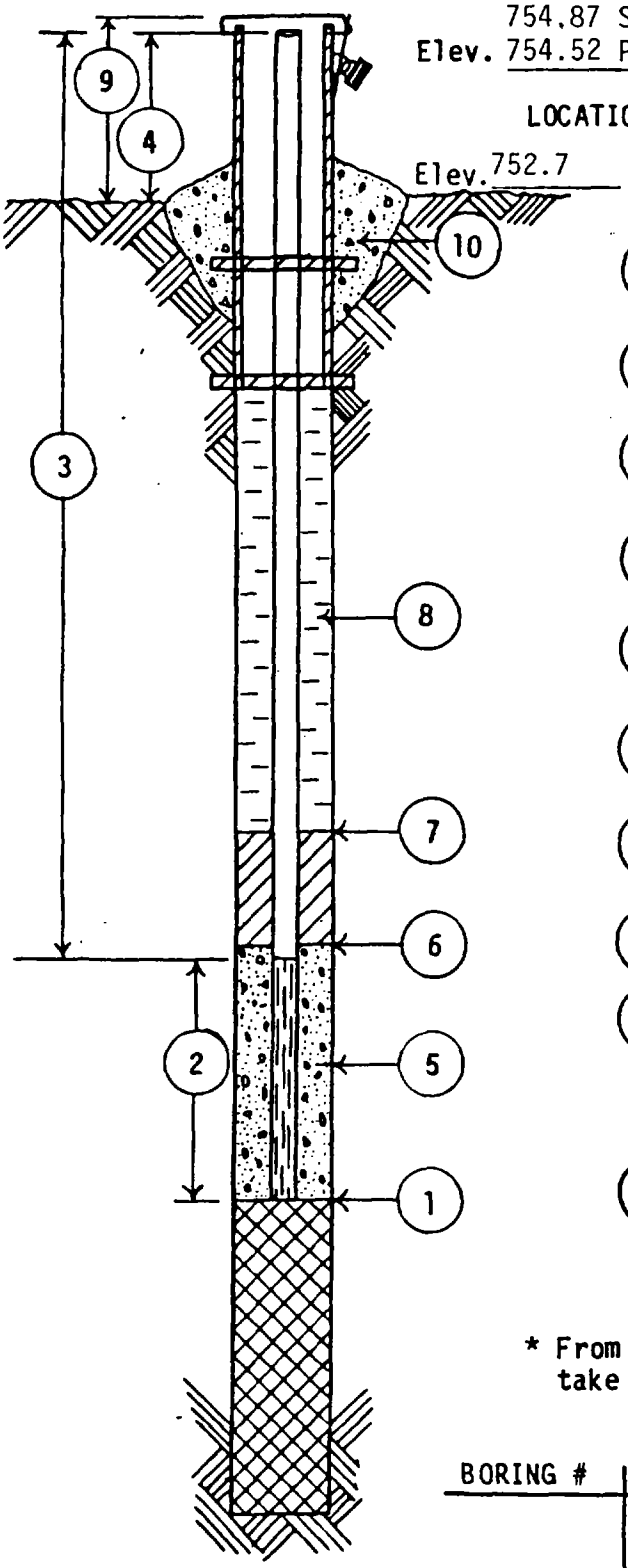
JOB NO. C 11440/800145

BORING NO. W-4

DATE 4/24/84

CHIEF SJW

LOCATION Beloit Corporation; Blackhawk Facility



Elev. 754.87 Steel
754.52 PVC

Elev. 752.7

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

1. DEPTH TO BOTTOM OF BOREHOLE 38 FEET
2. LENGTH OF WELL POINT, (WELL SCREEN), OR SLOTTED PIPE 10 FEET
3. TOTAL LENGTH OF SOLID PIPE 29.8 Flush Joint FEET @ 2 IN. DIAMETER
4. HEIGHT OF WELL CASING ABOVE GROUND 1.8 FEET
5. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand
6. DEPTH OF LOWER OR BOTTOM SEAL 4 FEET
7. DEPTH OF UPPER OR TOP SEAL 0 FEET
8. TYPE OF BACKFILL Sand
9. PROTECTIVE CASING (YES) NO
   HEIGHT ABOVE GROUND 2'
   LOCKING CAP (YES) NO
10. CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800145

BORING NO. W-5(P-3A)

DATE 4/25/84

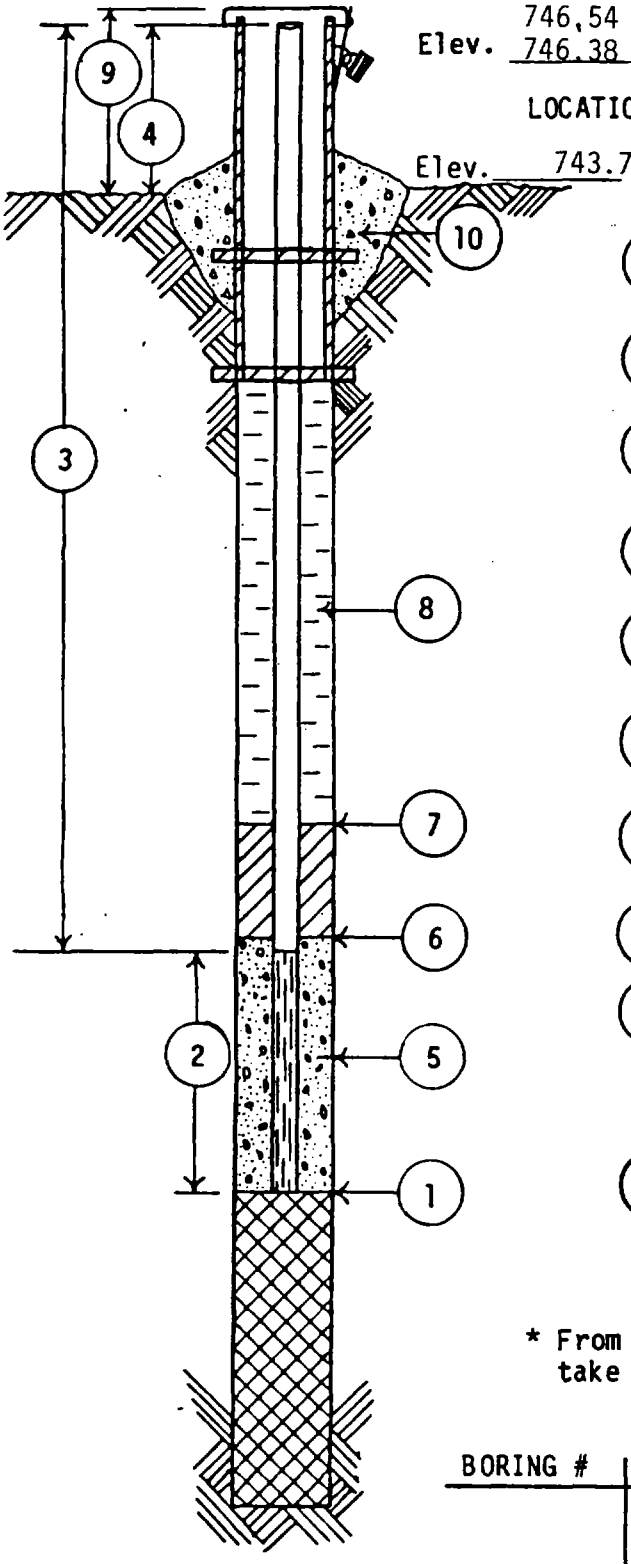
Elev. 746.54 Steel
746.38 PVC

CHIEF SJW

LOCATION Beloit Corporation; Blackhawk Facility

Elev. 743.7

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE
52.5 FEET

(2) LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 5 FEET

(3) TOTAL LENGTH OF SOLID PIPE 50.2 Flush Joint FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND
2.7 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL
45 FEET

(7) DEPTH OF UPPER OR TOP SEAL
40 FEET

(8) TYPE OF BACKFILL Sand

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2.8'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800145

BORING NO. W-6 (W-5)

DATE 4/20/84

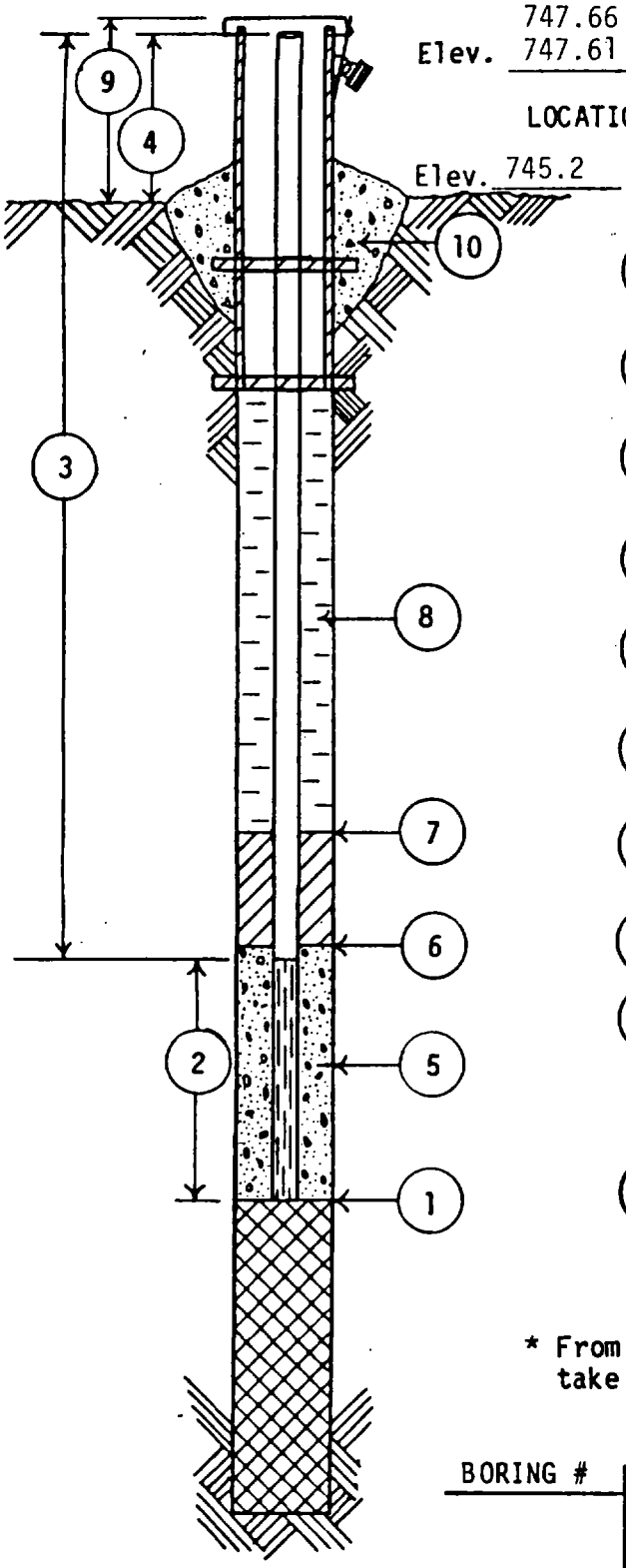
Elev. 747.66 Steel
747.61 PVC

CHIEF SJW

LOCATION Beloit Corporation Blackhawk Facility

Elev. 745.2

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE
38.4 FEET

(2) LENGTH OF WELL POINT, (WELL SCREEN), OR SLOTTED PIPE TO FEET

(3) TOTAL LENGTH OF SOLID PIPE 30.8 Flush Joint FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND
2.4 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL
4 FEET

(7) DEPTH OF UPPER OR TOP SEAL
0 FEET

(8) TYPE OF BACKFILL Sand

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2.5'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800145

BORING NO. W-7

DATE 4/18/84

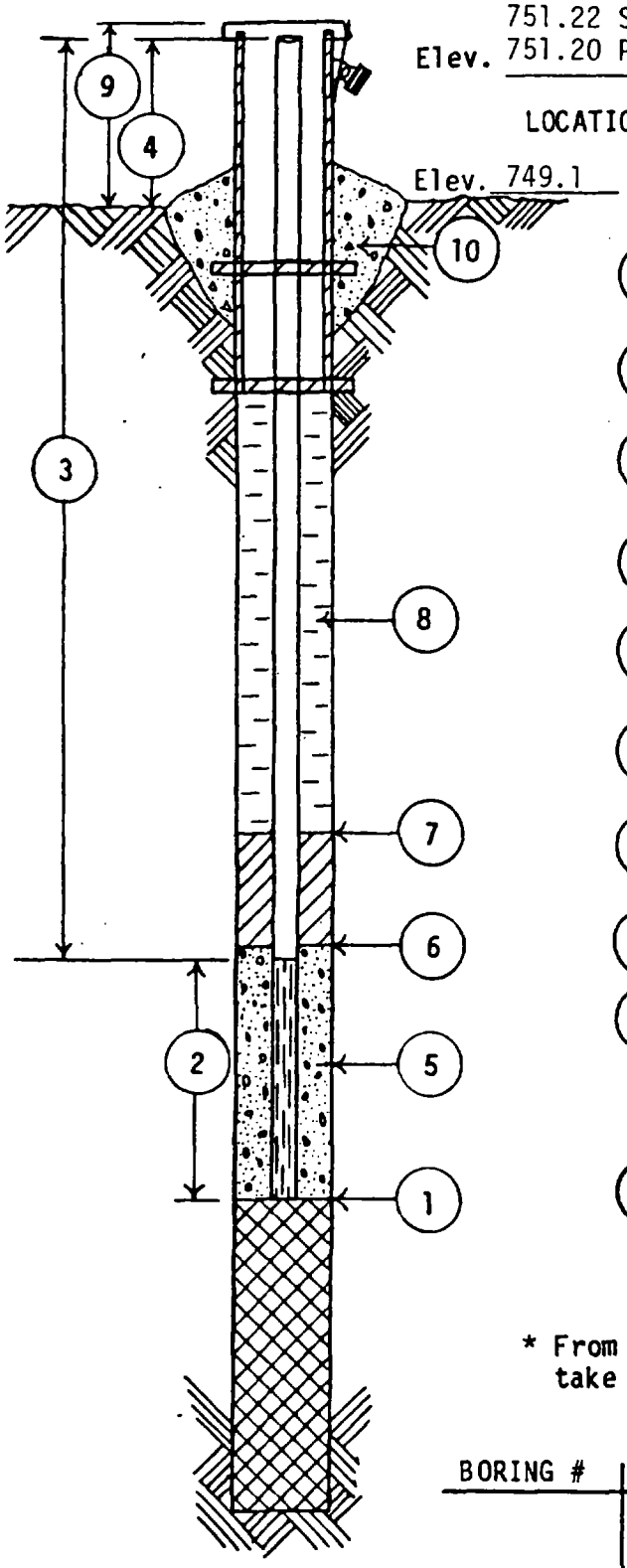
Elev. 751.22 Steel
751.20 PVC

CHIEF SJW

LOCATION Beloit Corporation; Blackhawk Facility

Elev. 749.1

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE
33.4 FEET

(2) LENGTH OF WELL POINT, (WELL SCREEN,) OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 25.5 Flush Joint FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND
2.1 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL
4 FEET

(7) DEPTH OF UPPER OR TOP SEAL
0 FEET

(8) TYPE OF BACKFILL Sand

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2.3'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

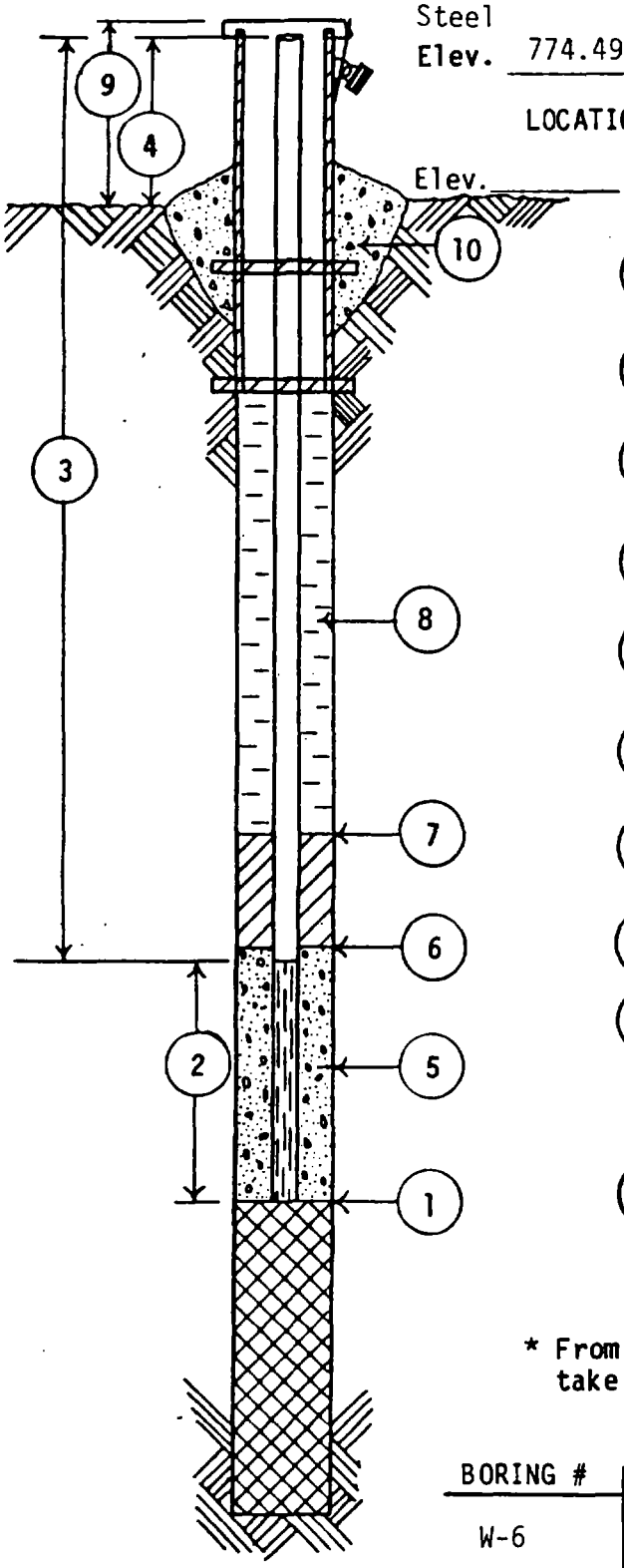
JOB NO. C 11440/800145

BORING NO. W-8(W-6)

DATE 5/10/84

CHIEF MG/SL

LOCATION Beloit Corporation/ Rockton, Illinois



All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.

(1) DEPTH TO BOTTOM OF BOREHOLE 54 FEET

(2) LENGTH OF WELL POINT, (WELL SCREEN), OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 46 FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND 2 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Flint Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL 4 FEET

(7) DEPTH OF UPPER OR TOP SEAL 0 FEET

(8) TYPE OF BACKFILL Sand & Gravel Spoils

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS
W-6	5/10/84	1/2 hour	42.5'	

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800145

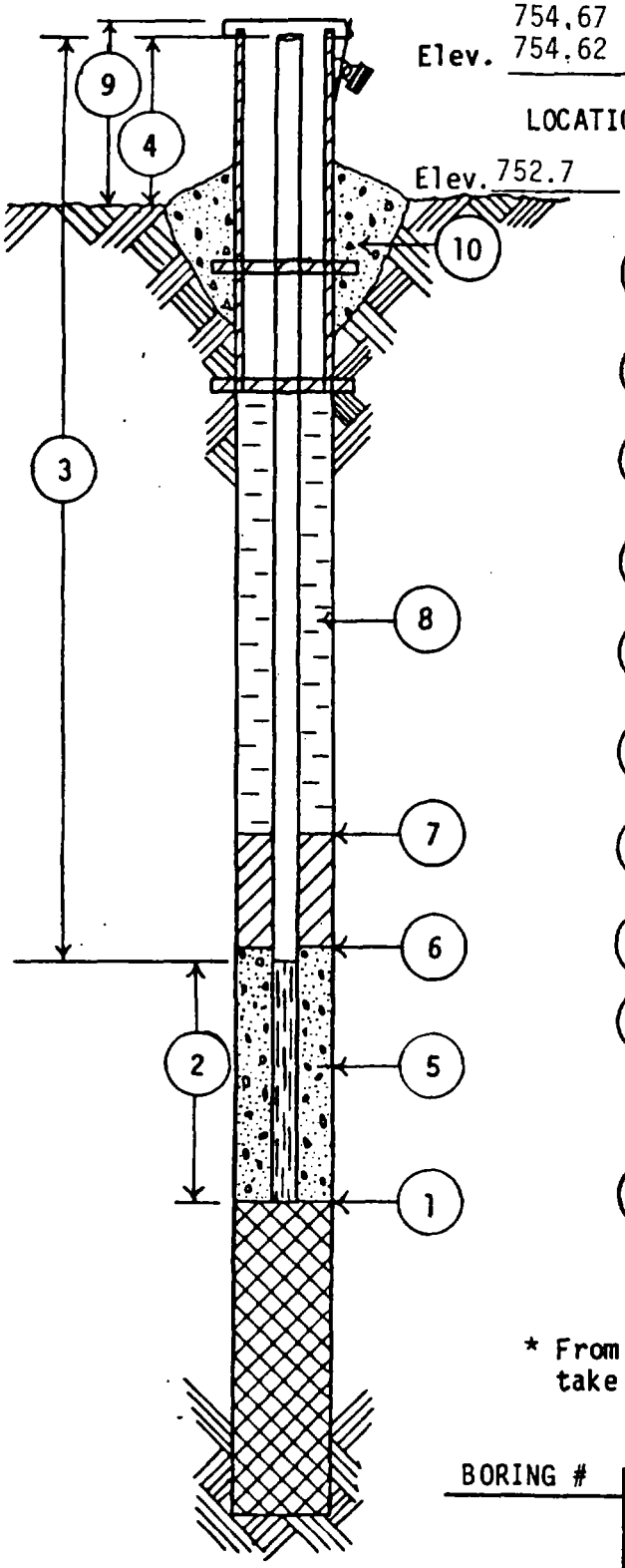
BORING NO. W-9 (W-8)

DATE 4/19/84

Elev. 754.67 Steel / 754.62 PVC CHIEF SJW

LOCATION Beloit Corporation; Blackhawk Facility

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



(1) DEPTH TO BOTTOM OF BOREHOLE
34.5 FEET

(2) LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 10 FEET

(3) TOTAL LENGTH OF SOLID PIPE 26.4 Flush Joint FEET @ 2 IN. DIAMETER

(4) HEIGHT OF WELL CASING ABOVE GROUND
1.9 FEET

(5) TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand

(6) DEPTH OF LOWER OR BOTTOM SEAL
4 FEET

(7) DEPTH OF UPPER OR TOP SEAL
0 FEET

(8) TYPE OF BACKFILL Sand

(9) PROTECTIVE CASING (YES) NO

HEIGHT ABOVE GROUND 2'

LOCKING CAP (YES) NO

(10) CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C11440/800145

BORING NO. W-10 (P-8A)

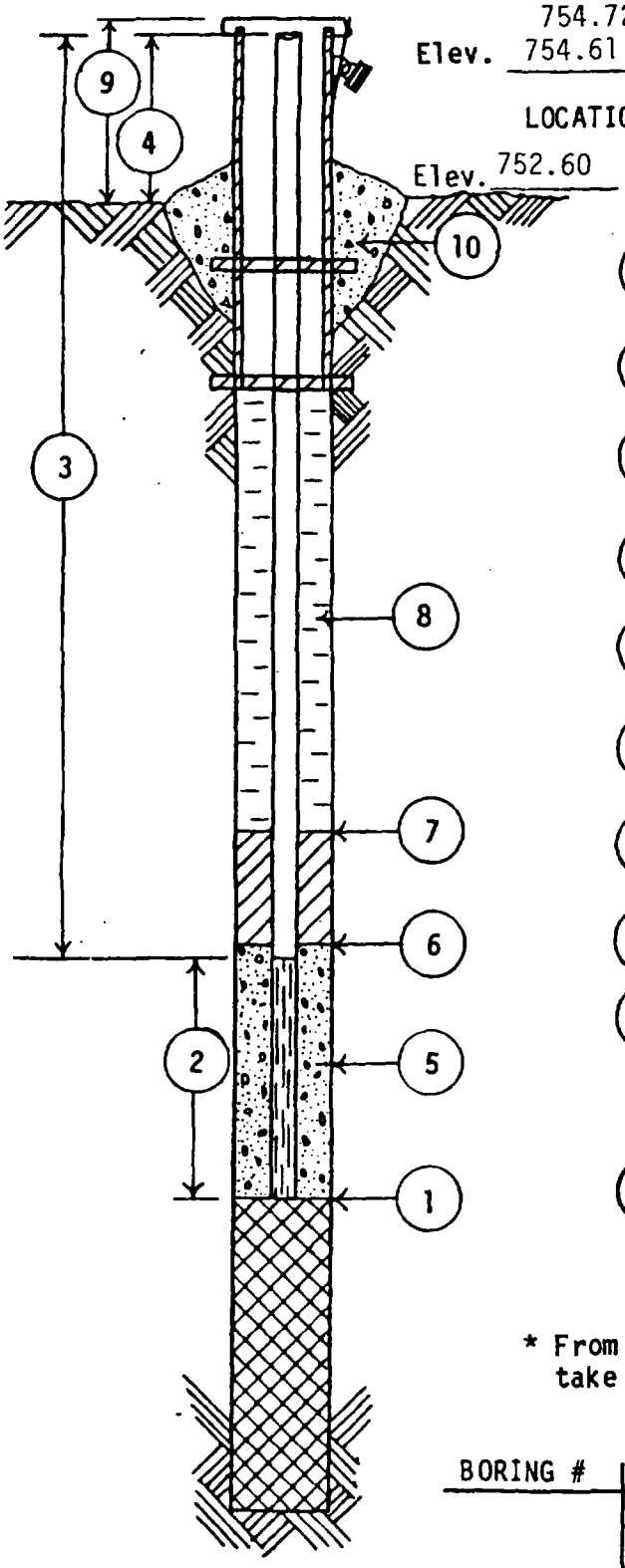
DATE 4/19/84

Elev. 754.72 Steel / 754.61 PVC CHIEF SJW

LOCATION Beloit Corporation: Blackhawk Facility

Elev. 752.60

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



1. DEPTH TO BOTTOM OF BOREHOLE 57.7 FEET
2. LENGTH OF WELL POINT, WELL SCREEN, OR SLOTTED PIPE 5 FEET
3. TOTAL LENGTH OF SOLID PIPE 54.7 Flush Joint FEET @ 2 IN. DIAMETER
4. HEIGHT OF WELL CASING ABOVE GROUND 2 FEET
5. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand
6. DEPTH OF LOWER OR BOTTOM SEAL 51 FEET
7. DEPTH OF UPPER OR TOP SEAL 48 FEET
8. TYPE OF BACKFILL Sand
9. PROTECTIVE CASING (YES) NO
   HEIGHT ABOVE GROUND 2'
   LOCKING CAP (YES) NO
10. CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

WELL DETAIL INFORMATION SHEET

JOB NO. C 11440/800145

BORING NO. W-11 (P-6A)

DATE 4/17/84

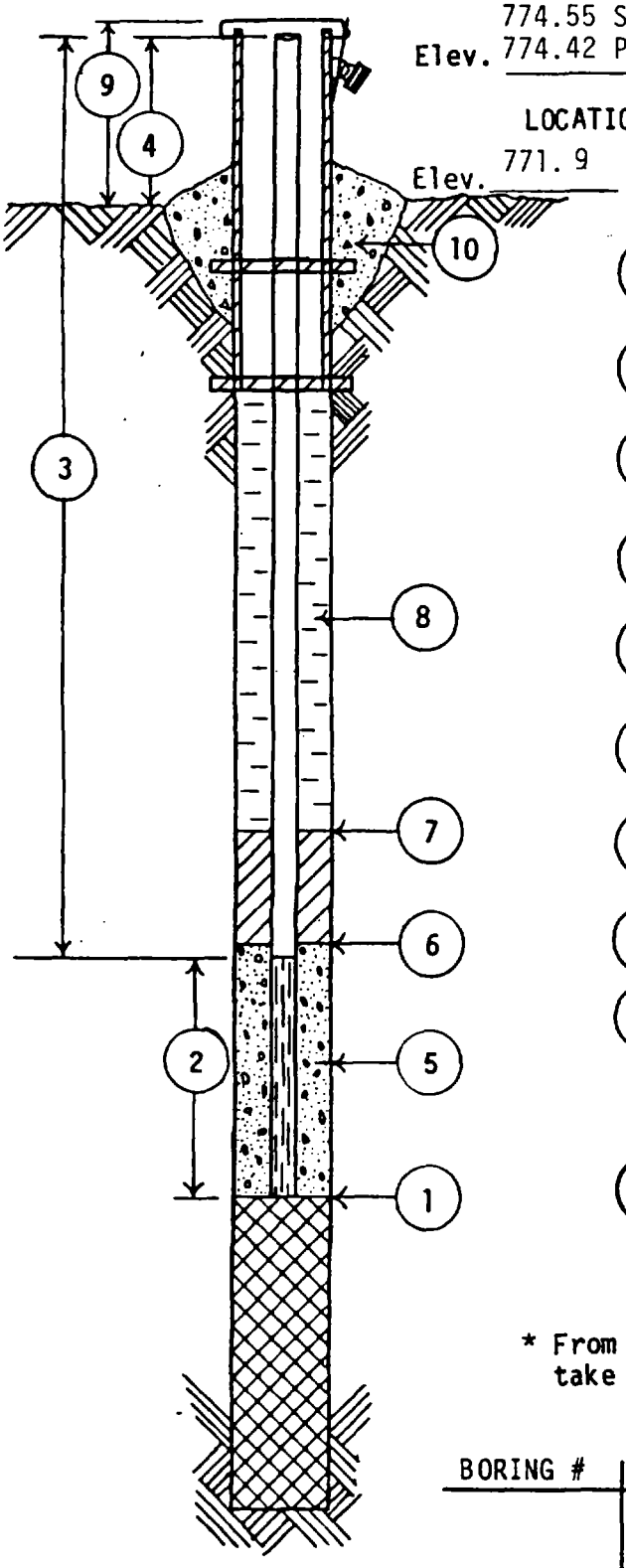
Elev. 774.55 Steel, 774.42 PVC

CHIEF SJW

LOCATION Beloit Corporation; Blackhawk Facility

Elev. 771.9

All depth measurements of well detail assumed to be from ground surface unless otherwise indicated.



1. DEPTH TO BOTTOM OF BOREHOLE 62 FEET
2. LENGTH OF WELL POINT, (WELL SCREEN), OR SLOTTED PIPE 5 FEET
3. TOTAL LENGTH OF SOLID PIPE 59.6 Flush Joint FEET @ 2 IN. DIAMETER
4. HEIGHT OF WELL CASING ABOVE GROUND 2.6 FEET
5. TYPE OF FILTER MATERIAL AROUND WELL POINT OR SLOTTED PIPE Sand
6. DEPTH OF LOWER OR BOTTOM SEAL 55 FEET
7. DEPTH OF UPPER OR TOP SEAL 50 FEET
8. TYPE OF BACKFILL Sand
9. PROTECTIVE CASING (YES) NO
   HEIGHT ABOVE GROUND 2.4'
   LOCKING CAP (YES) NO
10. CONCRETE CAP (YES) NO

WATER LEVEL CHECKS

* From top of casing, if protective casing higher take measurement from top of protective casing.

BORING #	DATE	TIME	DEPTH TO WATER	REMARKS

WARZYN ENGINEERING INC

[PJS-7-45]

APPENDIX D

SOIL BORING LOGS AND WELL INSTALLATION DETAILS
IEPA WELLS G101 AND G102

WARZYN
ENGINEERING INC

Illinois Environmental Protection Agency

BORING NO. B-1 | WELL NO G-101 | GROUNDLEVEL ELEV. 757.20 | PAGE 1 OF 1

COUNTY: Winnebago | SITE NO: 2010350 2

SITE: Rockton/Soterian

BORING LOCATION: 1/4 mi S. of intersection 75 + Route 2, W side of Roadway

DRILLING EQUIPMENT: CME-55 | SIZE: 3 1/2 in ID | TYPE: Hollow Stem Auger

COMPLETION DEPTH: 53.0' | BEDROCK DEPTH: -- | TOP OF CASING:

DATE: START 5/15/84 FINISH 5/15/84

TIME: START 7:30 AM FINISH 11:30 AM

ANNULUS FILL MATERIAL: ABOVE PACKING: cuttings; PACKING: concrete w/ 5% granular bentonite

SCREEN: slough

WELL CASING TYPE AND QUANTITY: 2" PVC Pipe w/ screw joints (teflon taped joints) (hack saw screen)

SCREEN INTERVAL TYPE AND QUANTITY: 15.0' of screened PVC : screened interval 37.3'-52.3'

PERSONNEL: L- JME, D- DMT, H- KWB

SAMPLES

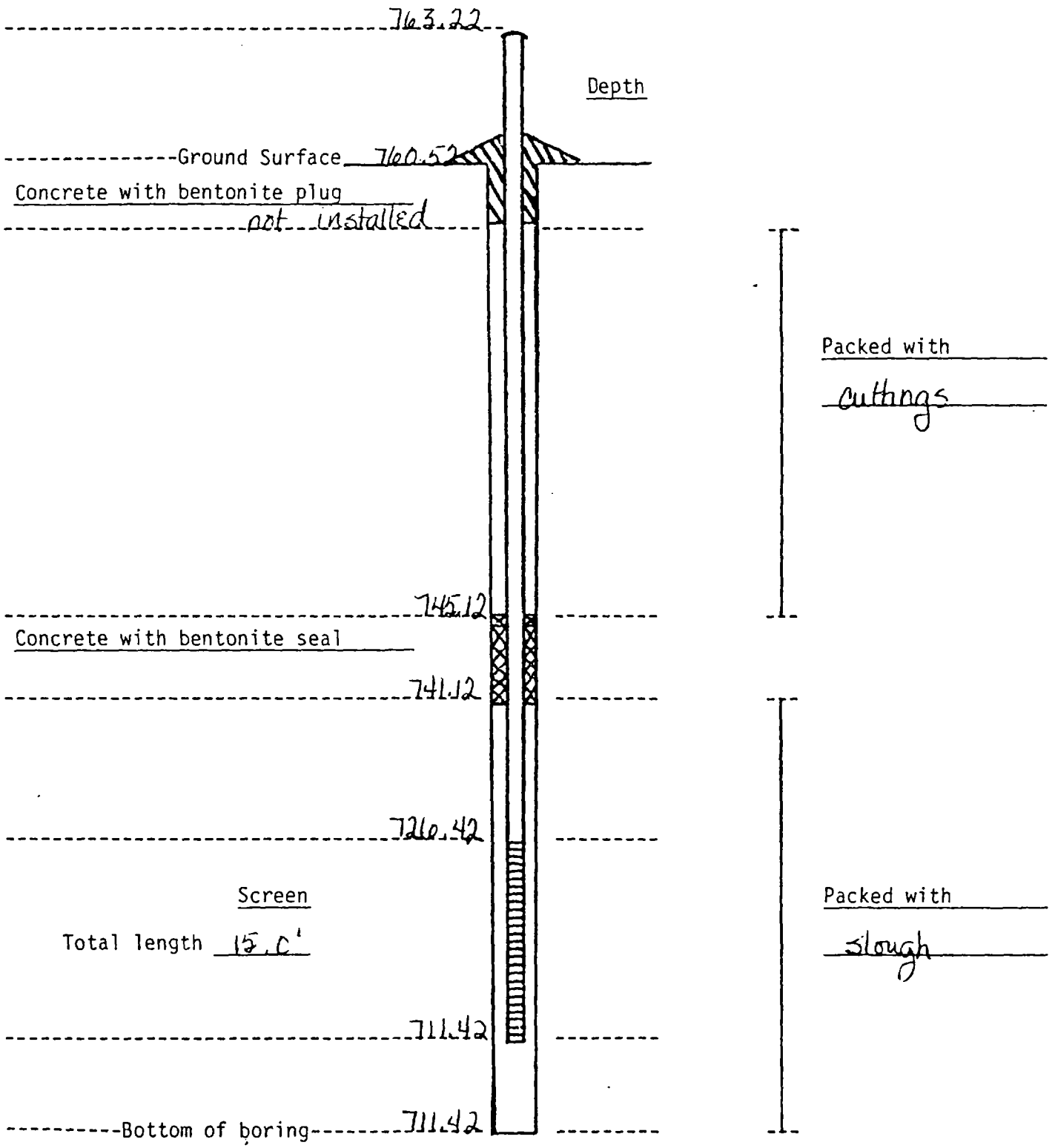
ELEV	DESCRIPTION	DEPTH	Sample No.	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0-2.4 Silt - brown to black, scattered sand, med. grained, very weathered, friable, sl. damp roots. @ 1.9-2.4 damp	0			3.6/5.0			
	2.4-2.5 Sand - lt brown to pink, sl damp fine to med grained, friable, small amount of Fe staining @ 2.4-2.45 Quartzite - rose in color, v. angular, small to med pieces	1 2 3 4						
	2.5-3.4 Sandy Gravel - lt. brown, sl. damp, friable, Gravel - rounded and angular Sand - sub-rounded, sub-ang. @ 2.9 sl. moist, Fe stain	5	CS					Augered from 5.0-53.0
	5.0-9.5 Gravelly Sand - brown, some what bedded. Gravel - rounded, various sizes Sand - moist, fine, med & large grain Sub-angular - sub-rounded.	10						
	9.5-15.2 Sand & Gravel - brown @ 15.2-25.0 moist @ 25.0-42.0 very moist	15						
	42.0 ▼							
	End of Boring @ 53.0	53						
	55.1' of PVC 15' of screen 2.8' of stick up							

MONITOR WELL CONSTRUCTION

Well No. G-102

Elev.

Prepared by: JME, [illegible]



Pipe: Type and quantity 2" PVC pipe w/ screw joints (teflon taped joints) 15.0' of screen (hack saw screen)

Illinois Environmental Protection Agency

BORING NO. B-2 | WELL NO G-102 | GROUNDLEVEL ELEV | PAGE 1 OF 1

COUNTY Winnebago | SITE NO. 2010350 2

SITE Rockton / Soterian

BORING LOCATION 200 yds N of intersection 75 + Route 2 E side of Roadway

DRILLING EQUIPMENT CME-55 | SIZE 3½ in ID | TYPE Hollow Stem Auger

COMPLETION DEPTH 49.0 | BEDROCK DEPTH — | TOP OF CASING

DATE START 5/15/84 FINISH 5/15/84

TIME START 2:00 PM FINISH 4:00 PM

ANNULUS FILL MATERIAL
ABOVE PACKING Cuttings
PACKING Concrete w/ 5% granular bentonite
SCREEN slough

WELL CASING TYPE AND QUANTITY
2" PVC Pipe w/ screw joints (teflon taped joints)
(hack saw screen)

SCREEN INTERVAL TYPE AND QUANTITY
15.0' of screened PVC ; screened interval 34.1' - 49.1

PERSONNEL
L. JME
D. DMT
H. KWB

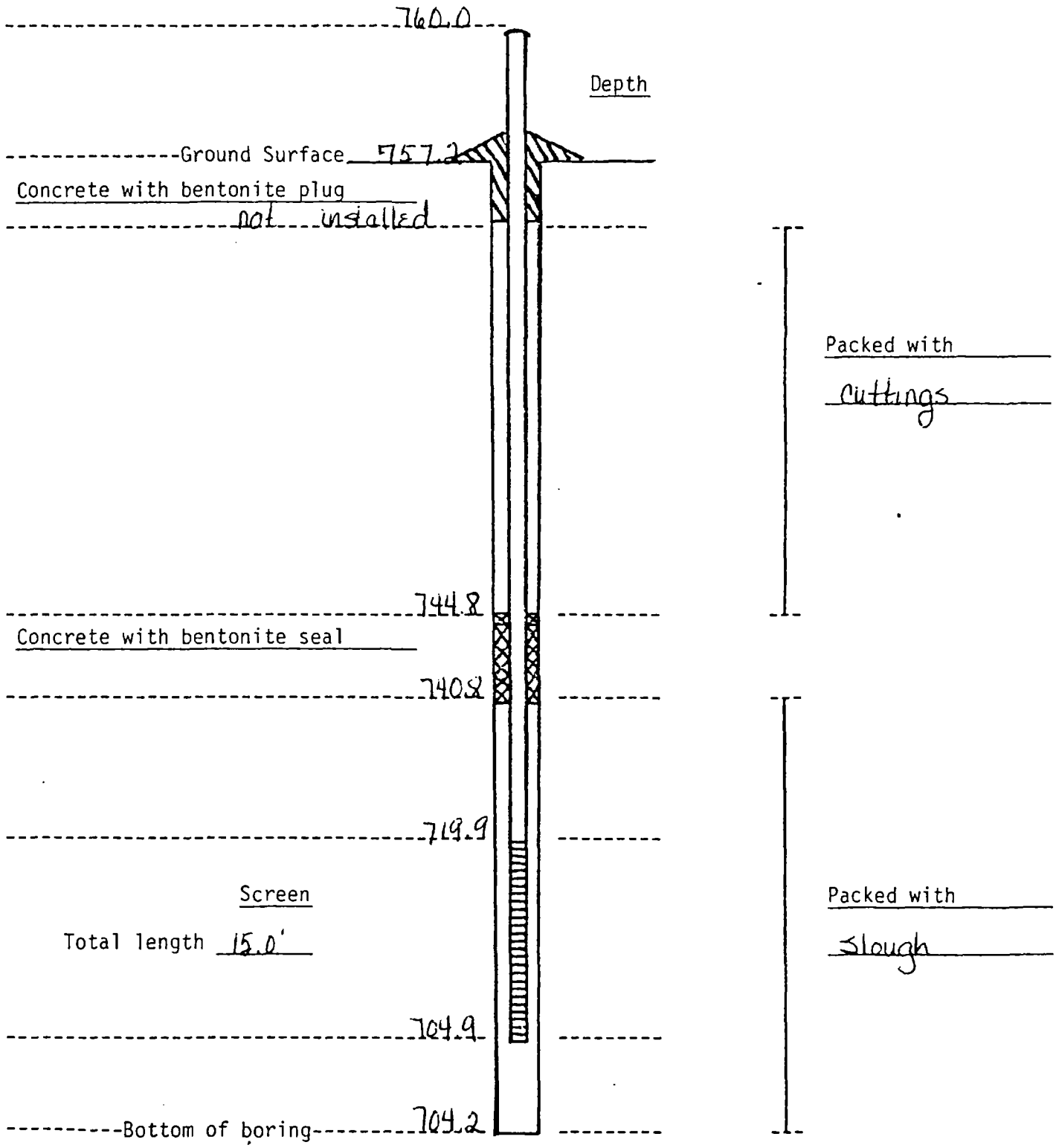
ELEV.	DESCRIPTION	DEPTH	Sample No	Sampler Type	Sample Recovery Ft.	Penetrometer (Strength)	N Value (Blows)	REMARKS
	0.0 - 2.2 Silt - brown to black, damp, friable, sand grains found scattered through sample, roots	0						
		1			3.6 / 5.0			
	2.2 - 3.6 Sand - reddish brown, med. grained, damp, v uniform.	2						
	5.0 - 6.0 Clayey Sand - brown, v. moist.	3						Augered from 5.0 - 49.0
	6.0 - 12.5 Sand - brown, v. uniform med. grained, v moist	4						
		5		CS				
	12.5 - 49.0 Sand & Gravel - brown sub-angular - sub-rounded moist. 39.5' ▼							
	End of Boring 49.0'	49						
	51.8' of PVC 15.0' of screen 2.7' stick up							

MONITOR WELL CONSTRUCTION

Well No. G-101

Prepared by: JME, DMT, KL

Elev.



Pipe: Type and quantity 2" PVC pipe w/ screw joints (teflon taped joints)
15.0' of screen (hack saw screen)

APPENDIX E

ANALYTICAL LABORATORY RESULTS
GROUNDWATER SAMPLES

DATES: 12-21-83
02-16-84
05-17-84

WARZYN
ENGINEERING INC

WARZYN ENGINEERING INC

ANALYTICAL LABORATORY RESULTS

Project: Beloit Corporation

Location: Beloit, Wisconsin

Date Received: 5/17/84
Project No: C 11440
Sheet 1 of 2
Ckd CAW App'd
Date Issued:

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

WEI Lab No.	Sample No.	Groundwater Elevation (feet)	pH (S.U.)	Conductivity @ 25°C umhos/cm	Chloride	Chemical Oxygen Demand	Hardness	Total Organic Carbon
9978	W-1 (W-1)*	728.77	7.2	1010	57	<10	440	2.1
9979	W-2 (W-2)	727.87	7.1	550	2	<10	319	5.1
9980	W-3 (W-3)	724.55	7.0	610	2	<10	429	1.5
9981	W-5 (P-3A)	724.46	7.5	570	3	<10	352	1.4
9982	W-4 (W-4)	723.28	7.0	590	12	<10	296	1.8
9983	W-6 (W-5)	726.90	7.0	985	<1	<10	449	2.8
9984	W-8 (W-6)	729.50	7.3	760	37	<10	368	2.8
9985	W-7 (W-7)	730.15	7.1	1020	147	<10	446	2.5
9986	W-9 (W-8)	730.03	7.1	1450	162	<10	470	2.5
9987	W-10 (W-8A)	730.08	7.0	750	73	<10	408	1.9
9988	441G (Plant Well #1)	-	7.0	530	<1	<10	289	<1.0

All parameters are mg/l unless otherwise stated.

*New ID Number (Warzyn Well ID)

WARZYN ENGINEERING INC

ANALYTICAL LABORATORY RESULTS

Project: Beloit Corporation

Location: Beloit, Wisconsin

Date Received: 5/17/84
Project No: C 11440
Sheet 2 of 2
Ckd CAW App'd
Date Issued:

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

WEI Lab No.	Sample No.	Cadmium	Lead	Manganese	Mercury	Total Suspended Solids
9978	W-1 (W-1)*	<0.01	<0.01	<0.05	<0.001	2790
9979	W-2 (W-2)	<0.01	0.01	0.12	<0.001	17000
9780	W-3 (W-3)	<0.01	<0.01	<0.05	<0.001	1170
9981	W-5 (P-3A)	<0.01	<0.01	0.06	<0.001	2200
9982	W-4 (W-4)	<0.01	<0.01	0.06	<0.001	3720
9983	W-6 (W-5)	<0.01	<0.01	0.09	<0.001	1610
9984	W-8 (W-6)	<0.01	<0.01	0.06	<0.001	42300
9985	W-7 (W-7)	<0.01	<0.01	<0.05	<0.001	4890
9986	W-9 (W-8)	<0.01	<0.01	<0.05	<0.001	8690
9987	W-10 (W-8A)	<0.01	<0.01	<0.05	<0.001	1090
9988	441G (Plant Well #1)	<0.01	<0.01	0.18	<0.001	<10

All parameters are mg/l unless otherwise stated.

*New ID Number (Warzyn Well ID)

MONITORING WELLS
BLACKHAWK

	WELL #1	#1	WELL #2	#2	WELL #3	#3	AVERAGE	DRINKING WATER STANDARDS
REPORT DATE	2-4-84	3-2-84	2-4-84	3-2-84	2-4-84	3-2-84		
SAMPLING DATE	12-21-83	2-16-84	12-21-83	2-16-84	12-21-83	2-16-84		
WATER LEVEL (FT.)	21'0"	21'4"	29'0"	30'0"	23'0"	23'0"		
WELL VOL. BAILED	2	2	2	2	2	2		
	MG/L		MG/L		MG/L		MG/L	MG/L
PH	8.04		8.06		8.01		8.037	6.5-8.5
BOD	2		29		3		11.333	
COD	30		59		47		45.333	
NITROGEN,AMMONIA	.09		.024		.06		0.058	
OIL & GREASE	< 1		< 1		< 1		1.000	
PHENOL	< .001		< .001		< .001		0.001	
PHOSPHORUS	.03		< .01		< .01		0.017	
SULFITE	< 2		< 2		< 2		2.000	
SOLIDS, SUSPENDED	39		705		22		255.333	
SOLIDS, TOTAL DIS.	553		363		394		436.667	500
ARSENIC	< .001		< .001		< .001		0.001	.05
BARIUM	.04		.07		< .01		0.040	1
CADMIUM	.003		.006		.002		0.004	.01
CHROMIUM	< .001		< .001		< .001		0.001	.05
COPPER	.009		.038		.008		0.018	
LEAD	< .01		.11		< .01		0.043	.05
MANGANESE	.056		.896		.104		0.352	.05
NICKEL	< .01		.02		< .01		0.013	
MERCURY	< .0001		< .001		< .0001		.0004	.002
SELENIUM	.002		.002		.001		0.002	.01
SILVER	.003		.002		< .001		0.002	.05
TOTAL ORGANIC CARBON	2.2		24.3		3.7		10.067	
COLOR	10		20		7		12.333	15 CU
NITROGEN, KJELDAHL	< .001		.32		< .001		0.107	
ZINC	.014		.026		.03		0.023	5

		WELL #1 UG/L	#1	WELL #2 UG/L	#2	WELL #3 UG/L	#3	
260	TETRACLOROETHYLENE	15	< 5	< 5	< 10	18	10	10.5
	METHYLENE CLORIDE	371	< 10	142	< 10	58	< 10	100.2
226	111 TRICHLOROETHANE	19	18	< 5	< 5	435	512	165.7
228	TRICHLOROETHEYLENE	< 5	< 5	< 5	< 5	142	101	43.8
U076	11 DICHLOROEHTANE	18	17	< 5	< 5	678	7.1	121.7

ALL OTHER VOLATILE
AND ACID COMPOUNDS
ARE (<)

SUMMARY OF VOLATILE ORGANIC ANALYSES - BELOIT CORPORATION
(5-17-84)

Compound List Volatile Organics	Detection Limit (ug/l)	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10
1V. CHLOROMETHANE	10	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	10	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	10	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	10	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	100	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	100	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	10	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	10	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	10	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	10	10	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	10	-	-	-	-	-	-	-	-	-	-
12V. CHLOROFORM	10	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	10	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	10	-	-	47	-	340	-	-	-	-	-
15V. CARBON TETRACHLORIDE	10	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	10	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	10	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	10	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	10	-	-	89	-	35	-	-	-	-	-
20V. BENZENE	10	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	10	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	10	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	10	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	10	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	10	-	-	-	-	12	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	10	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	10	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	10	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	10	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	10	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES		-	-	-	-	-	-	-	-	-	-

- = Below Detection Limit

All values in mg/l

AJS/dkp
[blc-29-9]

APPENDIX F

ANALYTICAL LABORATORY RESULTS
SOIL SAMPLES

WARZYN
ENGINEERING INC

WARZYN ENGINEERING INC

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

ANALYTICAL LABORATORY RESULTS

Project: Beloit Corporation

Location: Beloit, Wisconsin

Date Received: 5/29/84
Project No: C 11440
Sheet 1 of 1
Ckd CAH App'd
Date Issued:

SOIL TESTING RESULTS
24 HOUR LEACH TEST

PARAMETERS	1075 Blackhawk Storage Yard	1076 Foundry Sand
Sodium	2.3	1.0
Calcium	1.8	1.8
Sulfate	7	6
pH (S.U.)	7.35	6.95
Conductivity @ 25°C (umhos/cm)	75	40
Chemical Oxygen Demand	39	16

Results obtained are in mg/l unless otherwise stated, on the extract of a 24 hour leach test using Method SW-846 Section 7.0 (E.P. Toxicity without the addition of 0.5N acetic Acid).

WARZYN
ENGINEERING INC

ANALYTICAL LABORATORY RESULTS

Project: Beloit Corporation

Location: Beloit, Wisconsin

Date Received: 5/29/84
Project No: C 11440
Sheet 1 of 1
Ckd: CHL App'd:
Date Issued:

1409 EMIL STREET • P.O. BOX 9538, MADISON, WIS. 53715 • TEL. (608) 257-4848

SOIL TESTING RESULTS
EP TOXICITY TEST

PARAMETERS	1075 Blackhawk Storage Yard	1076 Foundry Sand
Chromium	<0.01	<0.01
Nickel	<0.05	<0.05
Manganese	0.52	<0.05
Zinc	0.06	<0.01
Iron	<0.10	<0.10
Copper	<0.05	<0.05
Phenols	<0.005	<0.005

Results obtained are in mg/l on an E.P. Toxicity Extraction. (Method: SW-846 Section 7.0)

APPENDIX G

SUMMARY OF WATER QUALITY ANALYSES
PRIVATE WATER SUPPLY WELLS

WARZYN
ENGINEERING INC

SUMMARY OF VOLATILE ORGANIC ANALYSES*
(10-28-82)

Compound List	Private Wells on Watts Avenue - Street Numbers														403 Dingman Drive	900 North Prairie	903 Prairie
Volatile Organics	905	909	910	913	914	917	918	1004	1005	1007	1009	1012	1018	1020			
1V. CHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	-	-	<60	-	4	-	36	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	-	-	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12V. CHLOROFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	-	-	282	-	35	-	463	2	-	-	-	-	-	-	-	-	-
15V. CARBON TETRACHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20V. BENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES																	

- = Below detection limit
* Samples obtained by Winnebago County Health Department and analyzed by Sanitary District of Rockford.
All values in ppb.

AJS/cwl/dkp
[blc-29-8]

SUMMARY OF VOLATILE ORGANIC ANALYSES*
(12-28-82)

Compound List	Private Wells on Watts Avenue - Street Numbers														403 Dingman Drive	900 North Prairie	903 Prairie
Volatile Organics	905	909	910	913	914	917	918	1004	1005	1007	1009	1012	1018	1020			
1V. CHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
12V. CHLOROFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	-	-	120	2	31	-	197	TR	-	-	-	-	-	-	-	-	-
15V. CARBON TETRACHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20V. BENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES																	

- = Below detection limit
* Samples obtained and analyzed by IEPA.
TR = Trace amount detected.
All values in ppb.

AJS/cwl/dkp
[blc-29-8]

SUMMARY OF VOLATILE ORGANIC ANALYSES*
(6-8-83)

Compound List	Private Wells on Watts Avenue - Street Numbers														403 Dingman Drive	900 North Prairie	903 Prairie
Volatile Organics	905	909	910	913	914	917	918	1004	1005	1007	1009	1012	1018	1020			
1V. CHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	3	-	6	-	-	-	4	-	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12V. CHLOROFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	4	-	220	-	32	-	370	2	-	-	-	-	-	-	-	-	-
15V. CARBON TETRACHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20V. BENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES																	

- = Below detection limit
* Samples obtained and analyzed by IEPA.

AJS/cwl/dkp
[blc-29-8]

C 11140

SUMMARY OF VOLATILE ORGANIC ANALYSES*
(8-9-83)

Compound List	Private Wells on Watts Avenue - Street Numbers														403 Dingman Drive	900 North Prairie	903 Prairie
Volatile Organics	905	909	910	913	914	917	918	1004	1005	1007	1009	1012	1018	1020			
1V. CHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	TR
12V. CHLOROFORM	TR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15V. CARBON TETRACHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20V. BENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES																	

- = Below detection limit
* Samples obtained and analyzed by IEPA.

AJS/cwl/dkp
[blc-29-8]

C 11140

SUMMARY OF VOLATILE ORGANIC ANALYSES*
(1-24-84)

Compound List	Private Wells on Watts Avenue - Street Numbers														403 Dingman Drive	900 North Prairie	903 Prairie
Volatile Organics	905	909	910	913	914	917	918	1004	1005	1007	1009	1012	1018	1020			
1V. CHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2V. VINYL CHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3V. CHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4V. BROMOMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5V. ACROLEIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6V. ACRYLONITRILE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7V. METHYLENE CHLORIDE (DICHLOROMETHANE)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8V. TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9V. 1,1-DICHLOROETHYLENE	-	-	33	-	24	-	16	-	-	-	-	-	-	-	-	-	-
10V. 1,1-DICHLOROETHANE	-	-	15	-	2	-	76**	11**	-	-	-	-	-	-	-	-	-
11V. TRANS-1,2-DICHLOROETHYLENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	TR
12V. CHLOROFORM	TR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13V. 1,2-DICHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14V. 1,1,1-TRICHLOROETHANE	2	-	105	TR	19	-	175	4	-	-	-	-	-	-	-	-	-
15V. CARBON TETRACHLORIDE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16V. BROMODICHLOROMETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17V. 1,2-DICHLOROPROPANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18V. TRANS-1,3-DICHLOROPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19V. TRICHLOROETHYLENE	-	-	1	-	-	-	TR	1	-	-	-	-	-	-	-	-	-
20V. BENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21V. CIS-1,3-DICHLORPROPENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22V. 1,1,2-TRICHLOETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23V. DIBROMOCHLOROMEHTANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24V. BROMOFORM	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25V. 1,1,2,2-TETRACHLOROETHYLENE	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26V. 1,1,2,2-TETRACHLOROETHANE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27V. TOLUENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28V. CHLOROBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29V. ETHYLBENZENE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30V. 2-CHLOROETHYL VINYL ETHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31V. TOTAL VOLATILES																	

- = Below detection limit
* Samples obtained and analyzed by IEPA.
** I.D. uncertain.

AJS/cwl/dkp
[blc-29-8]

APPENDIX H

CITIZEN COMPLAINTS TO IEPA REGARDING UNITED RECOVERY FACILITY

WARZYN
ENGINEERING INC

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY MEMORANDUM

DATE: September 27, 1983

TO: Heidi Hanson

FROM: Robert Godare

SUBJECT: United Recovery/Soterion

The attached photo copies of complaints (3) are for 1981. The people have not resubmitted forms lately due to the fact they were contacting us by phone rather than by mail. Mrs. Pat Marx has been appointed spokeswoman for the people, and she has kept the Agency informed on activity in the area. Mrs. Marx has logged telephone complaints with the writer on the following dates: August 3, 4, 9, 17 and September 6. Mrs. Rose of 826 N. Blackhawk also logged a complaint on September 23. The following list of citizens complained of odors and heavy smoke during a citizen's interview session on September 26, 1983.

Mrs. Baker	910 Watts
Mrs. Hayter	910 Watts
Mrs. McHone	918 Watts
Mr. Altenberg	914 Watts
Mrs. Lowery	1004 Watts
Mrs. Dunaway	1012 Watts
Mrs. Dunham	1005 Watts
Mrs. Rose	826 N. Blackhawk
Mrs. Marx	905 Watts

A followup letter is being sent to United Recovery stating violations of 9(A), 102 and 103(b) and requesting a compliance conference.

RG/bjs

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

POLLUTION COMPLAINT FORM

PLEASE PRINT OR TYPE

Name EDWARD A ROSE

Home Address 826 N BLACKHAWK City ROCKTON ILL

Business Address 707 FULTON AVE City ROCKFORD ILL

Home Phone 624-7372 Business Phone 987-6384

Briefly describe problem COMPANY EXTRACTING OIL AND CHEMICALS FROM SCRAP METAL AND WASTE PRODUCTS AS THEY BURN OFF OIL THIS CAUSES DENSE SMOKE WHICH FILLS THE SURROUNDING NEIGHBORHOOD OIL THEY DONT BURN IS DUMPED INTO THE GROUND DRAINAGE DITCHES ETC.

Known or Suspected Source (name & address) P D COMPANY WATTS AVE. ROCKTON ILL.

(phone) UNKNOWN

Owner's Name (if known) UNKNOWN

(phone) UNKNOWN

For how long a period have you noticed this pollution? (years, months, etc.) 18 MONTHS

Do you remember any specific dates and times when you noticed the pollution? EVER SINCE BUISNESS STARTED IN OUR NEIGHBORHOOD JULY 23 1981 WORST AUG 12TH MOST RECENT

Does the pollution occur at any certain period of the day and/or on any particular day of the week? ALL DAY MORNING TO EVENING MONDAY THRU FRIDAY

Has this pollution affected your person or property in any way? (please specify) SMUDGES HOUSE WINDOWS AND CARS SITTING OUT IN DRIVEWAY OFFENSIVE ODOR OBSCURES VISION HAVE TO KEEP DOORS AND WINDOWS CLOSED ON BAD DAYS

Has it affected others in your area? (yes or no) YES

If so, please give their names and addresses (phone)

THOMAS MARX 905 WATTS 624-7703

WARREN JOHNSON 901 WATTS 624-8261

EDWARD GRONSKI 907 DINGMAN 624-8307

Are you willing to testify, under oath, at an enforcement hearing? (yes or no)

Do you have photos or other physical evidence?

Have you previously discussed this problem with an IEPA employee? YES If yes, whom? (when) ROCKFORD EPA/ROCKTON FIRE DEPT JIM GLATZ

Signature Edward A. Rose. Date 8 13 81

EPA 103 (rev. 6-79)

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

POLLUTION COMPLAINT FORM

PLEASE PRINT OR TYPE

Name THOMAS O. MARX

Home Address 905 WATTS AVE. City ROCKTON, IL

Business Address 1400 EDDY AVE City ROCKFORD, IL

Home Phone 624-7703 Business Phone 877-5771

Briefly describe problem COMPANY PROCESSING OIL & CHEMICALS WITH METAL SCRAP - THEY BUY INDUST. WASTE PRODUCTS AND BURN OFF OILS TO RESELL SCRAP METAL - LARGE QUANITIES OF BLUE SMOKE AND OIL (AIRBORNE) - ALSO DUMPING OILS AND CHEMICALS INTO GROUND NEAR DRAINAGE AND WATER SUPPLIES.

Known or Suspected Source (name & address) PM COMPANY 800 TO 900 WATTS AVE - ROCKTON, IL

(phone) UNKNOWN

Owner's Name (if known) UNKNOWN

(phone) UNKNOWN

For how long a period have you noticed this pollution? (years, months, etc.) 1½ YRS

Do you remember any specific dates and times when you noticed the pollution? JULY 23, 1981 - WORST - ALL LAST YEAR - MADE SNOW DIRTY

Does the pollution occur at any certain period of the day and/or on any particular day of the week? ALWAYS EVENING & AFTER DARK

Has this pollution affected your person or property in any way? (please specify) YES - RESIDUE ON LAUNDRY & CLOTHING, ALSO IN GRASS - ON SHOES & ON CARPETING IN HOUSE

Has it affected others in your area? (yes or no) YES

If so, please give their names and addresses (phone)

MRS BAKER - 910½ WATTS 624-2083

MRS HAYTER - 910 WATTS 624-2291

EDW. ROSE - BLACKHAWK & DINGMAN 624-

WARREN JOHNSON - 909 WATTS 624-2261

JOHN DUNHAM - 403 DINGMAN 624-7730

Are you willing to testify, under oath, at an enforcement hearing? (yes or no) YES

Do you have photos or other physical evidence? YES

Have you previously discussed this problem with an IEPA employee? YES If yes, whom? (when) LARRY PRUNTY - LAST FALL

Signature Thomas O. Marx. Date 8-18-81

EPA 103 (rev. 6-79)

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

POLLUTION COMPLAINT FORM

PLEASE PRINT OR TYPE

Name Edward Glomski

Home Address 407 Dingman City Rockton Ill

Business Address _____ City _____

Home Phone 624-2307 Business Phone _____

Briefly describe problem They give off oil and chemicals from waste products and scrap metal, this fills the air with thick smoke and fumes. extra oil and waste chemicals are all over the ground and some is dumped into ditches and surrounding area

Known or Suspected Source (name & address) P.D.C. corporation wells ave Rockton Ill

(phone) unknown

Owner's Name (if known) unknown

(phone) unknown

For how long a period have you noticed this pollution? (years, months, etc.) 1 1/2 years

Do you remember any specific dates and times when you noticed the pollution? when they first opened and started operating up until present dating

Does the pollution occur at any certain period of the day and/or on any particular day of the week? usually during the week starting in the morning and through until late in the evening

Has this pollution affected your person or property in any way? (please specify)

Has it affected others in your area? (yes or no) yes

If so, please give their names and addresses (phone)

Edward Vega 908 N. Blackhawk 624-1378

Thomas Black 905 Wells 624-7705

Warren Dunbar 901 Wells 624-2241

Are you willing to testify, under oath, at an enforcement hearing? (yes or no) _____

Do you have photos or other physical evidence? _____

Have you previously discussed this problem with an IEPA employee? _____ If yes, whom? (when) _____

Signature Edward G. Glomski Date 5-13-81

EPA 103 (rev. 6-79)